TM 11-879

WAR DEPARTMENT TECHNICAL MANUAL

RECEIVER-TRANSMITTER BC-1335

WAR DEPARTMENT · *APRIL 1945*

TECHNICAL MANUAL

RECEIVER-TRANSMITTER BC-1335

CHANGES No. 1

DEPARTMENT OF THE ARMY
Washington 25, D. C., 26 April 1948

Receiver-Transmitter BC-1335, serial numbers 5000 through 5499 inclusive on Order No. 2217-Phila-48, is substantially the same as Receiver-Transmitter BC-1335 previously procured and described in TM 11-879. To make TM 11-879 applicable to Receiver-Transmitter BC-1335, serial numbers 5000 through 5499 inclusive on Order No. 2217-Phila-48, TM 11-879, 23 April 1945, is changed as follows:

The "warning notice" on the cover and title page is deleted.

Figure 7 is rescinded.

Change figure 17 as follows:

Change the value of R21 in the diagram and on the chart from 4,700 ohms to 470,000 ohms.

Change the value of C26 in the diagram and on the chart from 8 mmf to 10 mmf.

Change the value of C36 and C37 in the diagram and on the chart from 20 mmf to 15 mmf.

Show C50 inside the shielding of T5.

Change figures 28 and 37 as follows:

Change the value of R9 in the diagrams and on the charts from 27,000 ohms to 22,000 ohms.

Section XVII is rescinded.

Change figure 61 as follows:

Change the value of C26 from 8 mmf to 10 mmf.

Change the value of C36 and C37 from 20 mmf to 15 mmf.

Change the value of C24 from 40 mmf to 40 mf.

Change the value of R9 from 27M to 22M.

Change the value of R44 from 240M to 220M.

Change the value of R62 from 220M to 220 ohms.

Show C50 inside the shielding of T5.

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*These changes supersede so much of Addenda Sheet, 10 May 1945, as pertains to TM 11-879.

5. Table of Components

Component	Quantity
* * * * * *	*
Tube JAN–OB3/VR–90	2
Tube JAN–1L4	9
Tube JAN–1R5	3
Tibe JAN–3A5	6
Tube JAN–3Q4	3
Tube JAN–6AF6G	2
* * * * * *	*
* * * * * *	*

6. Shipping Weights and Dimensions of Packed Sets (Superseded)

Receiver-Transmitter BC–1335 is packed as a unit in a corrugated paper carton 16¾ inches wide by 13¾ inches deep by 11 1/16 inches high (fig. 8) with a total weight of approximately 38 pounds. The unit package is a double carton with a vaporproof barrier, or lining, around rhe inside carton. For export, the set is packed in a wooden crate holding three separate cartons which contain the following additional components of Radio Set SCR–619:

Quantity	*Description*
1	Set of 8 tubes:
2	JAN–1L4
1	JAN–1R5
1	JAN–3A5
1	JAN–3Q4
1	JAN–6AF6G
1	JAN–OB3/VR90
1	JAN–1A3
9	Batteries BB–54
3	Boxes CH–291

For further details on packaging of Receiver-Transmitter BC–1335 with tubes and batteries, and in a wooden crate with major components, refer to TM 11–619.

7. Description of Components

* * * * * * *

Note (Added). Crystal Holder FT–243 with crystal is used in both Receiver-Transmitter BC–1335 and Radio Receiver and Transmitter BC–659–( ). The channel frequencies and Signal Corps stock numbers are identical; therefore crystals marked for BC–1335 or BC–659 may be used interchangeably in either equipment.

8. Unpacking, Uncrating, and Checking (Superseded)

Unpack the receiver-transmitter carefully and inspect for possible damage during shipment (fig. 8). The receiver-transmitter is shipped with all tubes and crystals installed. To unpack, proceed as follows:

a. Open the carton with knife or other sharp instrument.

b. Open vaporproof barrier.

c. Remove four bags of silica gel on top of protection pad.

d. Remove protection pad.

e. Remove corner pads that hold unit in place in carton, and remove plywood panels at front and rear that protect control panel and antenna post.

f. Take unit out of inside carton.

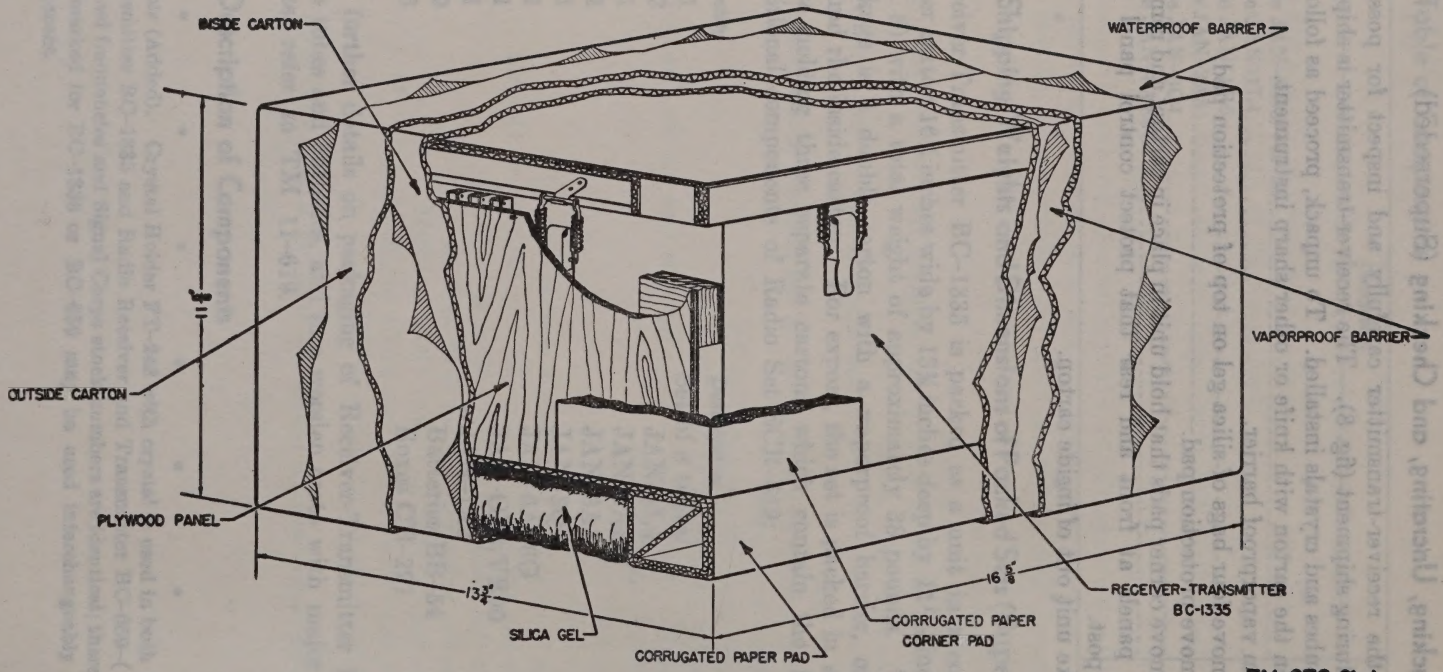
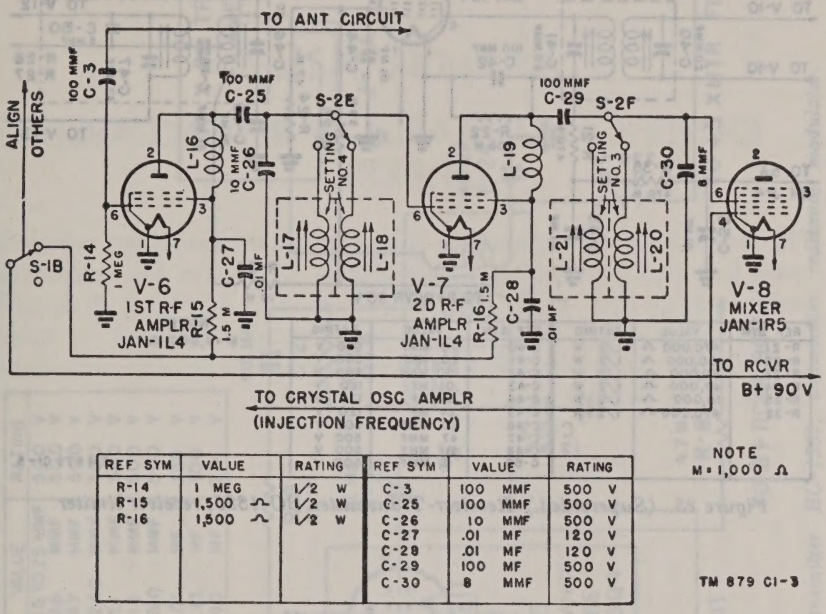


Figure 8. (*Superseded.*) *Receiver-Transmitter BC–1335, cutaway showing packaging.*

50. Soldering Tip (Superseded)

Refer to paragraph 93*b* for instructions on the construction of a special soldering iron tip.



REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-14	1 MEG	1/2 W	C-3	100 MMF	500 V
R-15	1,500 Ω	1/2 W	C-25	100 MMF	500 V
R-16	1,500 Ω	1/2 W	C-26	10 MMF	500 V
			C-27	.01 MF	120 V
			C-28	.01 MF	120 V
			C-29	100 MF	500 V
			C-30	8 MMF	500 V

NOTE
M = 1,000 Ω

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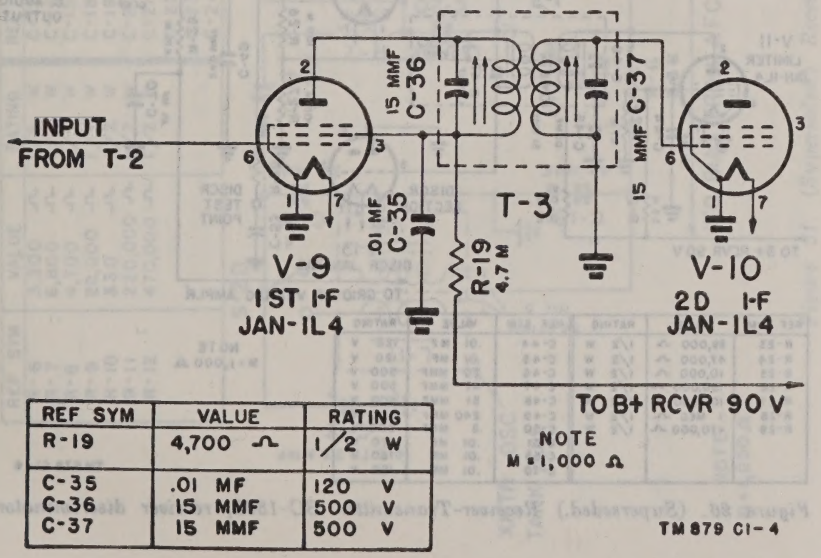
Figure 19. (Superseded.) Receiver-Transmitter BC–1335, receiver r-f amplifier.



REF SYM	VALUE	RATING
R-19	4,700 Ω	1/2 W
C-35	.01 MF	120 V
C-36	15 MMF	500 V
C-37	15 MMF	500 V

NOTE
M = 1,000 Ω

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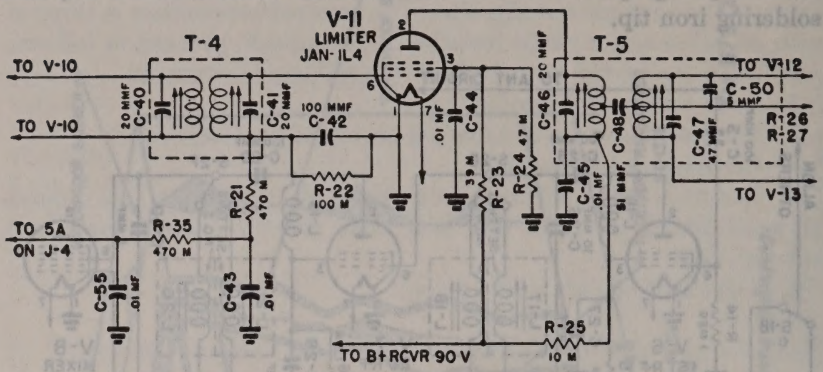
Figure 23. (Superseded.) Receiver-Transmitter BC–1335, receiver first i-f amplifier.



REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-21	470,000 Ω	1/2 W	C-40	20 MMF	500 V
R-22	100,000 Ω	1/2 W	C-41	20 MMF	500 V
R-23	39,000 Ω	1/2 W	C-42	100 MMF	500 V
R-24	47,000 Ω	1/2 W	C-43	.01 MF	120 V
R-25	10,000 Ω	1/2 W	C-44	.01 MF	120 V
R-35	470,000 Ω	1/2 W	C-45	.01 MF	120 V
			C-46	20 MMF	500 V
			C-47	47 MMF	500 V
			C-48	51 MMF	500 V
			C-50	5 MMF	500 V

NOTE
M = 1,000 Ω

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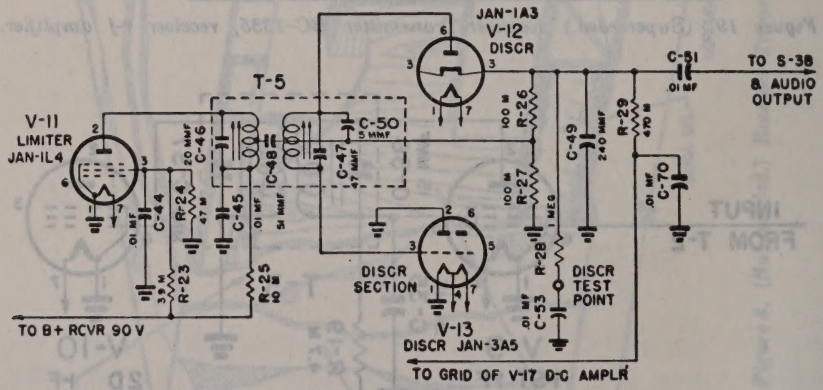
Figure 25. (Superseded.) Receiver-Transmitter BC–1335, receiver limiter.



REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-23	39,000 Ω	1/2 W	C-44	.01 MF	120 V
R-24	47,000 Ω	1/2 W	C-45	.01 MF	120 V
R-25	10,000 Ω	1/2 W	C-46	20 MMF	500 V
R-26	100,000 Ω	1/2 W	C-47	47 MMF	500 V
R-27	100,000 Ω	1/2 W	C-48	51 MMF	500 V
R-28	1 MEG Ω	1/2 W	C-49	240 MMF	500 V
R-29	470,000 Ω	1/2 W	C-50	5 MMF	500 V
			C-51	.01 MF	120 V
			C-53	.01 MF	120 V
			C-70	.01 MF	120 V

NOTE
M = 1,000 Ω

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Figure 26. (Superseded.) Receiver-Transmitter BC–1335, receiver discriminator.

REF SYM	VALUE	RATING
R-6	3,300	1/2 W
R-7	6,800	1/2 W
R-8	4,700	1/2 W
R-9	22,000	1/2 W
R-10	330	1/2 W
R-11	220,000	1/2 W
R-12	470,000	1/2 W

REF SYM	VALUE	RATING
C-12	4.5 TO 25 MMF	500 V
C-14	36 MMF	500 V
C-15	47 MMF	500 V
C-18	240 MMF	500 V
C-19	51 MMF	500 V
C-20	15 MMF	500 V
C-21	510 MMF	500 V
C-22	.01 MF	120 V
C-23	.13 MF	100 V
C-24	40 MF	25 V

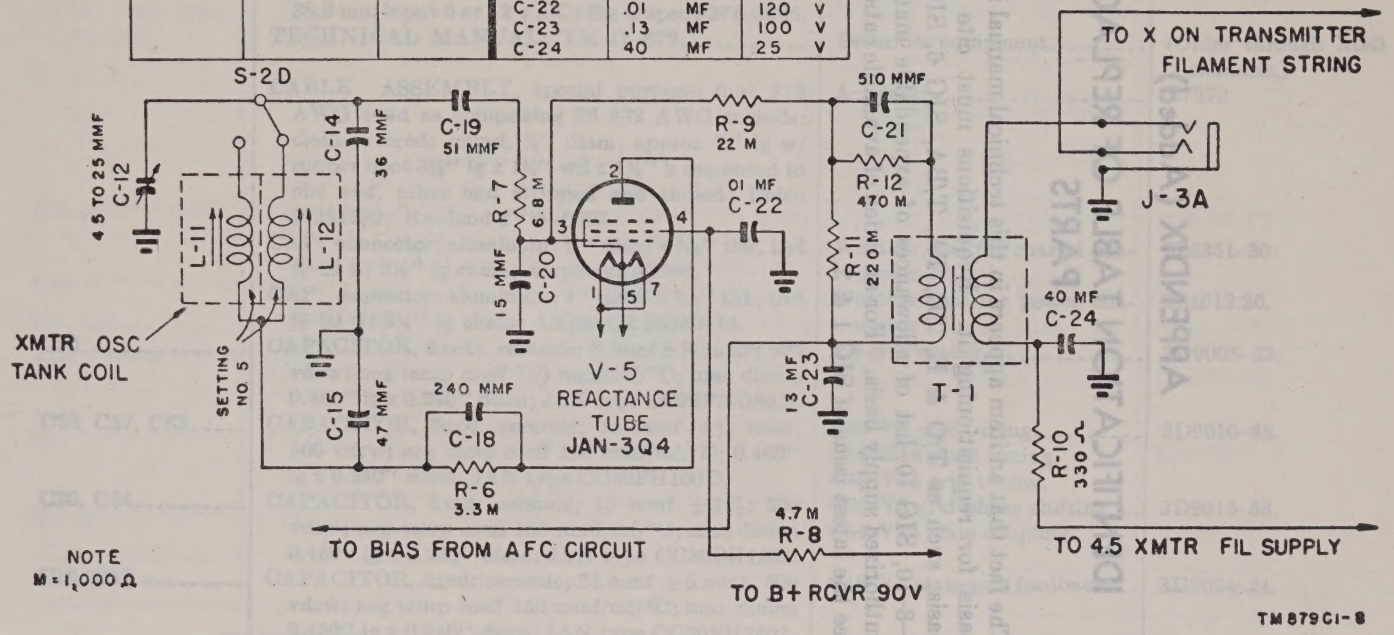

Figure 31. (Superseded.) Receiver-Transmitter BC–1335, transmitter reactance modulator.

APPENDIX (Added)

IDENTIFICATION TABLE OF REPLACEABLE PARTS

The fact that an item appears in this technical manual is not sufficient basis for requisitioning it. Requisitions must cite an authorized basis, such as T/O & E, TE, TA, T/BA, SIG 6, SIG 7 & 8, SIG 7–8–10, SIG 10, list of allowances of expendable material, or other authorized supply basis. For an index of available catalog pamphlets, see the latest issue of SIG 1 & 2.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	RECEIVER-TRANSMITTER BC–1335: vehicular and transportable; FM; output 1.8 w; freq 27 to 38.9 mc; input 6 or 12 v DC; Sig C spec #271–3096.	Transmits and receives voice radio signals.	2C5395–1335.
	TECHNICAL MANUAL: TM 11–879	Describes equipment	(Order through AGO channels.)
	CABLE ASSEMBLY, special purpose: four #18 AWG cond ea comprising 26 #32 AWG strands; cloth-covered; round, ¼″ diam; approx 7″ lg w/ rubber boot 3⅛″ lg x 1¼″ wd x 1⅜″ h cemented to one end, other end stripped and tinned; Delco #7254292; Rauland #VW–0603.	A–f cable	E7270.
	CAP: connector; aluminum; ¾″ diam x 9/16″ thk, thd ⅝–24 w/ 2¼″ lg chain; Amphenol #9760.	Weather seal for coaxial connector J2.	2Z3351–30.
	CAP: connector; aluminum; 1″ diam x 9/16″ thk, thd ⅞–20 w/ 2¼″ lg chain; Amphenol #9760–14.	Weather seal for power connector P1.	2Z1612.26.
C30	CAPACITOR, fixed: ceramic; 8 mmf ± ½ mmf; 500 vdcw; neg temp coeff 150 mmf/mf/°C; max dimen 0.460″ lg x 0.240″ diam; JAN type CC30PHO80D.	V8 grid tuning	3D9008–22.
C26, C57, C63	CAPACITOR, fixed: ceramic; 10 mmf ± ½ mmf; 500 vdcw; neg temp coeff 150 mmf/mf/°C; 0.460″ lg x 0.240″ diam; JAN type CC30PH100D.	C26–V7 grid tuning C57–V14 plate tuning. C63–V14 grid tuning.	3D9010–88.
C20, C64	CAPACITOR, fixed: ceramic; 15 mmf ± 5%; 500 vdcw; neg temp coeff 150 mmf/mf/°C; max dimen 0.460″ lg x 0.240″ diam; JAN type CC30PH150J.	C20–V5 grid phase shifting C64–V15 plate coupling.	3D9015–53.
C16, C17	CAPACITOR, fixed: ceramic; 24 mmf ± 5 mmf; 500 vdcw; neg temp coeff 150 mmf/mf/°C; max dimen 0.460″ lg x 0.240″ diam; JAN type CC30PH240J.	C16–V4 plate-grid feedback	3D9024–24.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
C8, C9	CAPACITOR, fixed: ceramic; 27 mmf ±2%; 500 vdcw; neg temp coeff 150 mmf/mf/°C; max dimen 0.460″ lg x 0.240″ diam; JAN type CC30PH270G.	C8–V1 grid tuning C9–V2 grid tuning.	3D9027–14.
C14	CAPACITOR, fixed: ceramic; 36 mmf ±5%; 500 vdcw; neg temp coeff 470 mmf/mf/°C; max dimen 0.460″ lg x 0.240″ diam; JAN type CC30TH360J.	V4 plate tuning	3D9036–6.
C15	CAPACITOR, fixed: ceramic; 47 mmf ±2%; 500 vdcw; neg temp coeff 80 mmf/mf/°C; max dimen 0.460″ lg x 0.240″ diam; JAN type CC30LH470G.	V4 plate tuning	3D9047–18.
C19	CAPACITOR, fixed: ceramic; 51 mmf ±2%; 500 vdcw; neg temp coeff 150 mmf/mf/°C; 0.460″ lg x 0.240″ diam; JAN type CC30PG510G.	V5 grid coupling and phase shifting.	3D9051–16.
C77 through C82	CAPACITOR, fixed: ceramic; feed-thru type; 1000 vdcw; neg temp coeff 520 mmf/mf/°C; 1 5/32″ lg x 1 1/32″ diam; Centralab #617–001.	C77–Transmitter filament string r-f bypass. C78–Receiver filament string r-f bypass. C79–Receiver high-voltage r-f bypass. C80–Transmitter high-voltage r-f bypass. C81–Transmitter filament string r-f bypass. C82–Receiver filament string r-f bypass.	3D9055–4.1

C3, C25, C29, C42, C56.	CAPACITOR, fixed: ceramic; 100 mmf ± 5%; 500 vdcw; neg temp coeff 330 mmf/mf/°C; max dimen 0.460" lg x 0.240" diam; JAN type CC30SL101J.	C3–Receiver antenna coupling. C25–V6 plate output coupling. C29–V7 plate output coupling. C42–V11 grid return bypass. C56–V14 plate output coupling.	3D9100–190.
C2, C10, C11, C13, C18, C49, C52, C54, C66.	CAPACITOR, fixed: ceramic; 240 mmf ± 2%; 500 vdcw; neg temp coeff 470 mmf/mf/°C; max dimen 1.165" lg x 0.315" diam; JAN type CC35TK241G.	C2–V1, V2 plate supply r-f bypass. C10–V3 plate output coupling. C11–V4 plate (pin 6) output coupling. C13–V4 plate (pin 2) output coupling. C18–V5 plate, R6 bypass. C49–V12 cathode bypass. C52–TEST PROD r-f bypass. C54–J4 pin 6 r-f bypass. C66–V16 oscillator tuning.	3D9240–19.
C21, C85	CAPACITOR, fixed: mica; 510 mmf ± 5%; 500 vdcw; max body dimen 5¼₄" lg x 15⁄32" wd x 7⁄32" thk; JAN type CM20B511J.	C21–Microphone input, h-f audio pre-emphasis. C85–High-voltage r-f filter.	3K2051122.

Identification Table of Replaceable Parts for Receiver-Transmitter BC-1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
C22, C27, C28, C31, C32, C35, C39, C43 through C45, C51, C53, C55, C59, C60, C62, C65, C67 through C72, C86, C87, C92.	CAPACITOR, fixed: paper; 10,000 mmf ± 10%; 120 vdcw; body dimen 51/64" lg x 15/32" wd x 7/32" thk; JAN type CN20E103K.	C22–V5 screen bypass. C27–V6 screen bypass. C28–V7 screen bypass. C31–V8 screen bypass. C32–V8 plate return bypass. C35–V9 screen bypass. C39–V10 screen bypass. C43–J4 pin 5A decoupling. C44–V11 screen bypass. C45–V11 plate return bypass. C51–V12 a-f output coupling. C53–V12 DISCR TEST POINT decoupling. C55–J4 pin 5A decoupling. C59–V8 grid (pin 4) return bypass. C60–V14 screen bypass. C62–V14 grid return bypass. C65–V15 plate return bypass. C67–V16 grid (pin 6) coupling. C68–V16 grid (pin 4) coupling. C69–V16 screen bypass. C70–V17 grid filter. C71–V17 screen bypass.	3DA10–406.

		C72–T6 primary, h–f audio attenuator. C86–P1 battery lead bypass. C87–P1 battery lead bypass. C92–Receiver filament string bypass.	
C75	CAPACITOR, fixed: paper; 20,000 mmf ±10%; 1500 vdcw; HS metal case; oil filled; 1 13/16" lg x 1" wd x ¾" h; Delco #7253765; Rauland #CO–203G.	T7 secondary buffer	3DA20–146.
C83A, B, C	CAPACITOR, fixed: paper; three sect; 100,000–100,000–100,000 mmf ±20%; 600 vdcw; HS metal case; oil filled; body dimen 1 13/16" lg x 1" wd x ¾" h; JAN type CP54B5FF104M.	C83A–High-voltage r-f filter. C83B–Transmitter filament string r-f filter. C83C–Receiver filament string r-f filter.	3DA100–766.
C23, C38, C88 through C91, C93.	CAPACITOR, fixed: paper; 130,000 mmf +30% −10%; 100 vdcw; HS metal case; oil filled; body dimen 1½" lg x 9/16" diam; Rauland #CO–134A.	C23–T1 secondary a-f bypass. C38–Receiver high-voltage line bypass. C88–V11 filament bypass. C89–V10 filament bypass. C90–V9 filament bypass. C91–V12 filament bypass. C93–Transmitter filament string bypass.	3DA13–15.
C76	CAPACITOR, fixed: paper; 500,000 mmf ±10%; 600 vdcw; HS metal case; oil filled; body dimen 1 13/16" lg x 1" wd x ⅞" h; Delco #7253766; Rauland #CO–504Y.	T7 primary buffer	3DA500–97.3.
C84A, B	CAPACITOR, fixed: electrolytic; 2 sect; 20–20 mf; 400 vdcw; HS, plug-in type: body dimen 2½" lg x 1½" diam; JAN type CE52C200Q.	C84A–High-voltage hum filter. C84B–High-voltage hum filter.	3DB20–108.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
C24	CAPACITOR, fixed: paper; 40 mf; 25 vdcw; body dimen 1 13/16" lg x 1" wd x 13/16" h; HS metal case; Dubilier #AVL–10071.	Microphone circuit a-f bypass	3DB40–54.
C73	CAPACITOR, fixed: electrolytic; 2000 mf; 15 vdcw; 3½" lg x 1 15/32" diam; Mallory #FP; Rauland #CE–208.	Filament circuit hum filter	3DB2000–4.1.
C1, C58, C61	CAPACITOR, variable: ceramic; 2.5 to 13 mmf; 500 vdcw; zero temp coeff; 1 7/16" lg x 41/64" wd x 3/8" h; Centralab #822BZ; Rauland #CV–130B.	C1—Antenna coupling C58–V14 plate tuning. C61–V14 grid tuning.	3D9013V–4.
C4	CAPACITOR, variable: air; 3.7–35.2 mmf; 0.016" air gap; SLC characteristic; lug term RH side; body 1¾" lg x 15/16" wd x 1 7/32" h; Amer Steel Pack #35–G, type H; Rauland #CV–350A.	V1, V2 plate tuning	3D9035VE2–1.
C5	CAPACITOR, variable: air; 3.7 mmf to 35.2 mmf; 0.016" air gap; SLC characteristic; lug term LH side; body 1¾" lg x 15/16" wd x 1 7/32" h; Amer Steel Pack #35–G, type H; Rauland #CV–350B.	V1, V2 plate tuning	3D9035VE2–2.
C6, C7	CAPACITOR, variable: ceramic; 4.5 to 25 mmf; 500 vdcw; zero temp coeff; 41/64" wd x 2 7/32" lg x 1 7/32" h; JAN type CV11A250.	C6–V1, V2 neutralizing C7–V1, V2 neutralizing.	3D9025V–82.
C12	CAPACITOR, variable: ceramic; 4.5 to 25 mmf; 500 vdcw; neg temp coeff; 500 mmf/mf/°C; 41/64" wd x 2 7/32" lg x 13/32" thk; JAN type CV11C250.	V4 plate tuning	3D9025V–80.
BT1	CELL, bias: Sig C Bias Cell BA–45; 1¼ v; cylindrical; 5/8" diam x 1 1/32" h over-all; Rauland #JB–0006; spec #JAN–B–18A.	Bias cell for calibrating V18	3A9045.

CRYSTAL UNIT, quartz: Army-Navy Crystal Unit CR–6/U ea unit consists of a quartz plate in Sig C Crystal Holder FT–243; over-all dimen 1 19/32" h x 13/16" wd x 13/32" thk.	Controls frequency of receiver-transmitter.	
CRYSTAL UNIT, quartz: 5675 kc; chan 27.0 mc		2X179–5675.
CRYSTAL UNIT, quartz: 5700 kc; chan 27.1 mc		2X179–5700.
CRYSTAL UNIT, quartz: 5725 kc; chan 27.2 mc		2X179–5725.
CRYSTAL UNIT, quartz: 5750 kc; chan 27.3 mc		2X179–5750.
CRYSTAL UNIT, quartz: 5775 kc; chan 27.4 mc		2X179–5775.
CRYSTAL UNIT, quartz: 5800 kc; chan 27.5 mc		2X179–5800.
CRYSTAL UNIT, quartz: 5825 kc; chan 27.6 mc		2X179–5825.
CRYSTAL UNIT, quartz: 5850 kc; chan 27.7 mc		2X179–5850.
CRYSTAL UNIT, quartz: 5875 kc; chan 27.8 mc		2X179–5875.
CRYSTAL UNIT, quartz: 5900 kc; chan 27.9 mc		2X179–5900.
CRYSTAL UNIT, quartz: 5925 kc; chan 28.0 mc		2X179–5925.
CRYSTAL UNIT, quartz: 5950 kc; chan 28.1 mc		2X179–5950.
CRYSTAL UNIT, quartz: 5975 kc; chan 28.2 mc		2X179–5975.
CRYSTAL UNIT, quartz: 6000 kc; chan 28.3 mc		2X179–6000.
CRYSTAL UNIT, quartz: 6025 kc; chan 28.4 mc		2X179–6025.
CRYSTAL UNIT, quartz: 6050 kc; chan 28.5 mc		2X179–6050.
CRYSTAL UNIT, quartz: 6075 kc; chan 28.6 mc		2X179–6075.
CRYSTAL UNIT, quartz: 6100 kc; chan 28.7 mc		2X179–6100.
CRYSTAL UNIT, quartz: 6125 kc; chan 28.8 mc		2X179–6125.
CRYSTAL UNIT, quartz: 6150 kc; chan 28.9 mc		2X179–6150.
CRYSTAL UNIT, quartz: 6175 kc; chan 29.0 mc		2X179–6175.
CRYSTAL UNIT, quartz: 6200 kc; chan 29.1 mc		2X179–6200.
CRYSTAL UNIT, quartz: 6225 kc; chan 29.2 mc		2X179–6225.
CRYSTAL UNIT, quartz: 6250 kc; chan 29.3 mc		2X179–6250.
CRYSTAL UNIT, quartz: 6275 kc; chan 29.4 mc		2X179–6275.
CRYSTAL UNIT, quartz: 6300 kc; chan 29.5 mc		2X179–6300.
CRYSTAL UNIT, quartz: 6325 kc; chan 29.6 mc		2X179–6325.
CRYSTAL UNIT, quartz: 6350 kc; chan 29.7 mc		2X179–6350.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	CRYSTAL UNIT, quartz: 6375 kc; chan 29.8 mc		2X179–6375.
	CRYSTAL UNIT, quartz: 6400 kc; chan 29.9 mc		2X179–6400.
	CRYSTAL UNIT, quartz: 6425 kc; chan 30.0 mc		2X179–6425.
	CRYSTAL UNIT, quartz: 6450 kc; chan 30.1 mc		2X179–6450.
	CRYSTAL UNIT, quartz: 6475 kc; chan 30.2 mc		2X179–6475.
	CRYSTAL UNIT, quartz: 6500 kc; chan 30.3 mc		2X179–6500.
	CRYSTAL UNIT, quartz: 6525 kc; chan 30.4 mc		2X179–6525.
	CRYSTAL UNIT, quartz: 6550 kc; chan 30.5 mc		2X179–6550.
	CRYSTAL UNIT, quartz: 6575 kc; chan 30.6 mc		2X179–6575.
	CRYSTAL UNIT, quartz: 6600 kc; chan 30.7 mc		2X179–6600.
	CRYSTAL UNIT, quartz: 6625 kc; chan 30.8 mc		2X179–6625.
	CRYSTAL UNIT, quartz: 6650 kc; chan 30.9 mc		2X179–6650.
	CRYSTAL UNIT, quartz: 6675 kc; chan 31.0 mc		2X179–6675.
	CRYSTAL UNIT, quartz: 6700 kc; chan 31.1 mc		2X179–6700.
	CRYSTAL UNIT, quartz: 6725 kc; chan 31.2 mc		2X179–6725.
	CRYSTAL UNIT, quartz: 6750 kc; chan 31.3 mc		2X179–6750.
	CRYSTAL UNIT, quartz: 6775 kc; chan 31.4 mc		2X179–6775.
	CRYSTAL UNIT, quartz: 6800 kc; chan 31.5 mc		2X179–6800.
	CRYSTAL UNIT, quartz: 6825 kc; chan 31.6 mc		2X179–6825.
	CRYSTAL UNIT, quartz: 6850 kc; chan 31.7 mc		2X179–6850.
	CRYSTAL UNIT, quartz: 6875 kc; chan 31.8 mc		2X179–6875.
	CRYSTAL UNIT, quartz: 6900 kc; chan 31.9 mc		2X179–6900.
	CRYSTAL UNIT, quartz: 6925 kc; chan 32.0 mc		2X179–6925.
	CRYSTAL UNIT, quartz: 6950 kc; chan 32.1 mc		2X179–6950.
	CRYSTAL UNIT, quartz: 6975 kc; chan 32.2 mc		2X179–6975.
	CRYSTAL UNIT, quartz: 7000 kc; chan 32.3 mc		2X179–7000.
	CRYSTAL UNIT, quartz: 7025 kc; chan 32.4 mc		2X179–7025.

CRYSTAL UNIT, quartz: 7050 kc; chan 32.5 mc		2X179–7050.
CRYSTAL UNIT, quartz: 7075 kc; chan 32.6 mc		2X179–7075.
CRYSTAL UNIT, quartz: 7100 kc; chan 32.7 mc		2X179–7100.
CRYSTAL UNIT, quartz: 7125 kc; chan 32.8 mc		2X179–7125.
CRYSTAL UNIT, quartz: 7150 kc; chan 32.9 mc		2X179–7150.
CRYSTAL UNIT, quartz: 7175 kc; chan 33.0 mc		2X179–7175.
CRYSTAL UNIT, quartz: 7200 kc; chan 33.1 mc		2X179–7200.
CRYSTAL UNIT, quartz: 7225 kc; chan 33.2 mc		2X179–7225.
CRYSTAL UNIT, quartz: 7250 kc; chan 33.3 mc		2X179–7250.
CRYSTAL UNIT, quartz: 7275 kc; chan 33.4 mc		2X179–7275.
CRYSTAL UNIT, quartz: 7300 kc; chan 33.5 mc		2X179–7300.
CRYSTAL UNIT, quartz: 7325 kc; chan 33.6 mc		2X179–7325.
CRYSTAL UNIT, quartz: 7350 kc; chan 33.7 mc		2X179–7350.
CRYSTAL UNIT, quartz: 7375 kc; chan 33.8 mc		2X179–7375.
CRYSTAL UNIT, quartz: 7400 kc; chan 33.9 mc		2X179–7400.
CRYSTAL UNIT, quartz: 7425 kc; chan 34.0 mc		2X179–7425.
CRYSTAL UNIT, quartz: 7450 kc; chan 34.1 mc		2X179–7450.
CRYSTAL UNIT, quartz: 7475 kc; chan 34.2 mc		2X179–7475.
CRYSTAL UNIT, quartz: 7500 kc; chan 34.3 mc		2X179–7500.
CRYSTAL UNIT, quartz: 7525 kc; chan 34.4 mc		2X179–7525.
CRYSTAL UNIT, quartz: 7550 kc; chan 34.5 mc		2X179–7550.
CRYSTAL UNIT, quartz: 7575 kc; chan 34.6 mc		2X179–7575.
CRYSTAL UNIT, quartz: 7600 kc; chan 34.7 mc		2X179–7600.
CRYSTAL UNIT, quartz: 7625 kc; chan 34.8 mc		2X179–7625.
CRYSTAL UNIT, quartz: 7650 kc; chan 34.9 mc		2X179–7650.
CRYSTAL UNIT, quartz: 7675 kc; chan 35.0 mc		2X179–7675.
CRYSTAL UNIT, quartz: 7700 kc; chan 35.1 mc		2X179–7700.
CRYSTAL UNIT, quartz: 7725 kc; chan 35.2 mc		2X179–7725.
CRYSTAL UNIT, quartz: 7750 kc; chan 35.3 mc		2X179–7750.
CRYSTAL UNIT, quartz: 7775 kc; chan 35.4 mc		2X179–7775.
CRYSTAL UNIT, quartz: 7800 kc; chan 35.5 mc		2X179–7800.
CRYSTAL UNIT, quartz: 7825 kc; chan 35.6 mc		2X179–7825.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	CRYSTAL UNIT, quartz: 7850 kc; chan 35.7 mc		2X179–7850.
	CRYSTAL UNIT, quartz: 7875 kc; chan 35.8 mc		2X179–7875.
	CRYSTAL UNIT, quartz: 7900 kc; chan 35.9 mc		2X179–7900.
	CRYSTAL UNIT, quartz: 7925 kc; chan 36.0 mc		2X179–7925.
	CRYSTAL UNIT, quartz: 7950 kc; chan 36.1 mc		2X179–7950.
	CRYSTAL UNIT, quartz: 7975 kc; chan 36.2 mc		2X179–7975.
	CRYSTAL UNIT, quartz: 8000 kc; chan 36.3 mc		2X179–8000.
	CRYSTAL UNIT, quartz: 8025 kc; chan 36.4 mc		2X179–8025.
	CRYSTAL UNIT, quartz: 8050 kc; chan 36.5 mc		2X179–8050.
	CRYSTAL UNIT, quartz: 8075 kc; chan 36.6 mc		2X179–8075
	CRYSTAL UNIT, quartz: 8100 kc; chan 36.7 mc		2X179–8100.
	CRYSTAL UNIT, quartz: 8125 kc; chan 36.8 mc		2X179–8125.
	CRYSTAL UNIT, quartz: 8150 kc; chan 36.9 mc		2X179–8150.
	CRYSTAL UNIT, quartz: 8175 kc; chan 37.0 mc		2X179–8175.
	CRYSTAL UNIT, quartz: 8200 kc; chan 37.1 mc		2X179–8200.
	CRYSTAL UNIT, quartz: 8225 kc; chan 37.2 mc		2X179–8225.
	CRYSTAL UNIT, quartz: 8250 kc; chan 37.3 mc		2X179–8250.
	CRYSTAL UNIT, quartz: 8275 kc; chan 37.4 mc		2X179–8275.
	CRYSTAL UNIT, quartz: 8300 kc; chan 37.5 mc		2X179–8300.
	CRYSTAL UNIT, quartz: 8325 kc; chan 37.6 mc		2X179–8325.
	CRYSTAL UNIT, quartz: 8350 kc; chan 37.7 mc		2X179–8350.
	CRYSTAL UNIT, quartz: 8375 kc; chan 37.8 mc		2X179–8375.
	CRYSTAL UNIT, quartz: 8400 kc; chan 37.9 mc		2X179–8400.
	CRYSTAL UNIT, quartz: 8425 kc; chan 38.0 mc		2X179–8425.
	CRYSTAL UNIT, quartz: 8450 kc; chan 38.1 mc		2X179–8450.
	CRYSTAL UNIT, quartz: 8475 kc; chan 38.2 mc		2X179–8475.
	CRYSTAL UNIT, quartz: 8500 kc; chan 38.3 mc		2X179–8500.

	CRYSTAL UNIT, quartz: 8525 kc; chan 38.4 mc		2X179–8525.
	CRYSTAL UNIT, quartz: 8550 kc; chan 38.5 mc		2X179–8550.
	CRYSTAL UNIT, quartz: 8575 kc; chan 38.6 mc		2X179–8575.
	CRYSTAL UNIT, quartz: 8600 kc; chan 38.7 mc		2X179–8600.
	CRYSTAL UNIT, quartz: 8625 kc; chan 38.8 mc		2X179–8625.
	CRYSTAL UNIT, quartz: 8650 kc; chan 38.9 mc		2X179–8650.
L1	COIL, RF: antenna; single winding; single layer wound; unshielded; 9 turns #20 AWG copper wire; $1\frac{11}{16}$'' lg x $1\frac{3}{8}$'' diam over-all; Delco #7254225; Rauland #LV–0016.	Antenna inductor	3C1084Z3–20.
L28	COIL, RF: bias oscillator; single winding, 1 pie universal wound; shielded; rectangular steel can; $1\frac{49}{64}$'' lg x $\frac{7}{8}$'' wd x $1\frac{15}{64}$'' h; Delco #7254438; Rauland #LL–0041.	V16 oscillator tank	3C1084Z3–27.
L5, L8, L16, L19, L24, L27, L29.	COIL, RF: choke; single winding; 2 pie universal wound; unshielded; 70 turns #38SSE wire per pie; $\frac{7}{16}$'' diam x $\frac{3}{4}$'' lg; Delco #7253929; Rauland #LC–0176.	L5—V1, V2 grid r-f choke L8—V3 plate r-f choke. L16—V6 plate r-f choke. L19—V7 plate r-f choke. L24—V14 plate r-f choke. L27—V15 plate r-f choke. L29—Receiver high-voltage r-f choke.	3C1084Z3–15.
L9, L10, L13	COIL, RF: choke; single winding; 2 pie universal wound; unshielded; 140 turns #38SSE wire per pie; distributed capacity 0.7 mmf; $\frac{5}{8}$'' diam x $\frac{3}{4}$'' lg; Delco #7253930; Rauland #LC–0177.	L9—V3 grid r-f choke L10—V3 grid r-f choke. L13—V4 plate r-f choke.	3C1084Z3–28.
L2, L4	COIL, RF: transformer; 2 windings; single layer wound; 5 turns #20 AWG tapped $\frac{7}{8}$ turn and at $2\frac{1}{2}$ turns; $\frac{1}{2}$ turn of #22 AWG ins wire; $1\frac{3}{8}$'' lg x $1\frac{1}{4}$'' diam over-all; Delco #7254224; Rauland #LQ–0115.	L2—Antenna coupling L4—V1, V2 plate tank.	3C1084Z3–29.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
L6, L7	COIL ASSEMBLY, RF: doubler; single winding; single layer wound; shielded; rectangular aluminum can; 1½″ wd x ¾″ thk x 3⁹⁄₁₆″ h; adj iron cores; 2 knob adjustments on top; Delco #7254079.	L6—V1, V2 grid tank L7—V1, V2 grid tank.	3C1084Z3–25.
L11, L12	COIL ASSEMBLY, RF: transmitter oscillator; single winding, single layer wound; shielded; rectangular aluminum can; 1½″ wd x ¾″ thk x 3⁹⁄₁₆″ h; adj iron cores; 2 knob adjustments on top; Delco #7254080.	L11—V4 plate tank L12—V4 plate tank.	3C1084Z3–30.
P2	CONNECTOR, adapter: single contact; brass; 2⅛″ lg x 1⅜″ diam over-all; Delco #7253908; Rauland #UG–2330.	Antenna connector	2Z307–51.
J2	CONNECTOR, receptacle: Sig C Socket SO–239; single round female cont; straight; 1⁹⁄₁₆″ lg x 1″ wd x 1″ h; Sig C dwg #SC–D–5850.	Antenna connector	2Z8799–239.
P1	CONNECTOR, receptacle: 3 round male cont; straight; 2⁹⁄₃₂″ lg x 1³⁄₁₆″ sq flange; Amphenol #AN–3102–14S–7P.	Battery connector	2Z3023–5.
J4	CONNECTOR ASSEMBLY: female contact; six pin jacks on bakelite strip; 2⁹⁄₁₆″ lg x ½″ wd x ¹⁹⁄₃₂″ h over-all; Delco #7253616; Rauland #VT–0243.	Metering strip	2Z3067–22.
F1	FUSE FU–21: cartridge; 10 amp. 25 v; glass body; ferrule term; 1¼″ lg x ¼″ diam.	Protects equipment from overloads.	3Z1921A.
	FASTENER, latch: case; steel; 50 lb capacity; 2⁹⁄₁₆″ lg x 1½″ wd x ½″ thk w/2 tension springs; Corbin #15821.	For mounting equipment	6Z3810–68.

FASTENER, latch: case; steel; 100 lb capacity; $2\frac{15}{16}$'' lg x $1\frac{7}{8}$'' wd x $1\frac{1}{16}$'' h w/2 tension springs; Corbin #15801.	For mounting equipment	6Z3810–49.
GASKET: antenna connector; black neoprene; 1'' sq x $\frac{1}{16}$'' thk w/5 holes; Delco #7253520; Rauland #QR–0224.	For antenna connector	2Z4866.245.
GASKET: antenna connector; black neoprene; $1\frac{3}{8}$'' OD x $\frac{5}{16}$'' ID x 0.050'' thk w/3 holes; Delco #725527; Rauland #QR–0220.	For antenna connector	2Z4866.246.
GASKET: antenna connector; flange; black neoprene; $3\frac{27}{32}$'' OD x $2\frac{15}{16}$'' ID x $\frac{1}{16}$'' thk; Delco #7253442; Rauland #QR–0222.	For antenna connector	2Z4866.244.
GASKET: band switch; black neoprene; single hole; $\frac{5}{8}$'' OD x $\frac{1}{2}$''; 0.062'' thk; Delco #7253517; Rauland #QR–0216.	For band switch	2Z4866.243.
GASKET: case cover; black neoprene; 11'' lg x 10'' wd x $\frac{7}{32}$'' thk; Delco #7253639; Rauland #QR–0221.	For case cover	2Z4866.238.
GASKET: jack water seal; black neoprene; $2\frac{1}{32}$'' OD x $2\frac{3}{64}$'' ID x $\frac{1}{32}$'' thk; Delco #7253464; Rauland #QR–0218.	For jack water seal	2Z4866.240.
GASKET: power connector; black neoprene; $1\frac{3}{16}$'' sq x $\frac{1}{16}$'' thk w/5 holes; Delco #7253519; Rauland #QR–0214.	For power connector	2Z4866.242.
GASKET: volume control; black neoprene; $\frac{1}{2}$'' OD x $\frac{3}{8}$'' ID x 0.062'' thk; Delco #7253534; Rauland #QR–0223.	For volume control	2Z4866.241.
HOLDER, fuse: extractor post; for single #3AG fuse; bakelite body; $2\frac{3}{8}$'' lg x $\frac{3}{4}$'' diam over-all; Littelfuse #342001; Rauland #SF–0168.	Holds F1	3Z3275–1.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	INSULATOR, bushing: cylindrical; natural bakelite; 7/8" lg over-all, base diam 0.593", top 0.515"; 0.437" ID; Delco #7253444.	For current indicator lamp	3G1836–14.
	INSULATOR, disk: flat; phenolic; 4" diam x 1/2" thk; Delco #7253633.	For antenna connector P2	3G1838–64.8.
J3A, B, C	JACK ASSEMBLY, telephone: 3 jacks on metal strip; 2 for 2 cond phone plug, 1 for 3 cond microphone plug; 2 5/64" lg x 3/4" wd x 1.240" d over-all, strip 3/64" thk; Delco #7254251.	J3A–MIC jack J3B–PH jack. J3C–PH jack.	4C4312–20.
	KNOB: bar; black alumalite; for double flat 1/4" diam shaft; 1/8" hole for mtg screw; 1" lg x 3/8" wd x 13/32" h over-all; Delco #7253629; Rauland #QD–0212.	For controls	2Z5822–131.
I1	LAMP, incandescent: 2 v, 0.060 amp; bulb T–3–1/4 clear; miniature bayonet base; 1 3/16" lg over-all; Mazda #49, Sylvania Prod #S–49.	I1—R-f power amplifier current indicator.	2Z5971.1.
J1	LAMPHOLDER: miniature bayonet; steel shell body; 1 1/4" lg x 1 1/8" wd x 7/8" d over-all; Delco #7253665; Rauland #SL–0049.	J1—Holds I1	2Z5883–229.
	LEAD, test: single #18 AWG stranded cond; bakelite jacket; 20" lg w/metal tip one end; Delco #7253918.	For test prod	3E7270–1.
	MOUNTING, fuseholder: zinc die casting; 2 7/16" lg x 1 3/8" wd x 15/16" thk over-all; Delco #7253754; Rauland #JS–0124.	For fuse holder	2Z6740.7.
	MOUNTING ASSEMBLY, battery: mts four 1 1/4 v bias cells; consists of four holders on bakelite strip; 3 5/8" lg x 1 3/16" wd x 1 3/16" over-all; Delco #7253506.	Mounts bias cells	2Z6740.6.

	POST, binding: screw type; 1 9/32" lg x 1/2" diam overall; 1 1/32" lg x 0.164" diam mtg stem w/#8-32 thd; Delco #7253873; Rauland #BG-1177.	Ground for pack antenna	3Z741-16.
	PULLER, tube: for 7 prong miniature type tubes; woven wire; approx 2" lg w/variable diameter; diameter decreases w/increase in length; Kellems #11-16.	For removing tubes	6R7443-7.
L30	REACTOR: filter choke; 0.008 hy min; 0.8 amp; 530 ohms DC resistance; 500 vdcw; HS metal case; 3 5/8" lg x 1 1/2" diam less term; Jeffsonelec #466-001-205; Rauland #LC-0174.	L30—Hum filter	3C1084Z3-26.
L35	REACTOR: filter choke; 3.7 hy, 145 ma; 125 ohms DC resistance; 170 v operating; HS metal case; 2 3/32" max lg x 2 7/32" wd x 2 3/4" h less term; Jeffsonelec #466-001-206.	L35—High-voltage filter	3C323-145C.
R66	RESISTOR, fixed: wire-wound; 0.31 ohms ±10%; 7 w; body dimen 1 1/16" lg x 7/16" diam; Rauland #RW-0310AA8.	R66—Limits battery current during 12-volt operation.	3C5983-17.
R59, R60	RESISTOR, fixed: composition; 10 ohms ±5%; 1/2 w; max body dimen 0.468" lg x 0.249" diam; JAN type RC20BF100J.	R59—Receiver filament voltage dropping. R60—Receiver filament voltage dropping.	3RC20BF100J.
R61	RESISTOR, fixed: composition; 18 ohms ±5%; 1/2 w; max body dimen 0.468" lg x 0.249" diam; JAN type RC20BF180J.	R61—Receiver filament voltage dropping.	3RC20BF180J.
R2	RESISTOR, fixed: composition; 39 ohms ±5%; 1/2 w; max body dimen 0.468" lg x 0.249" diam; JAN type RC20BF390J.	R2—Transmitter filament voltage balance.	3RC20BF390J.
R56	RESISTOR, fixed: wire-wound; 40 ohms ±10%; 7 w; 1 1/16" lg x 7/16" diam; Lectrohm 1T.	R56—Drops vibrator coil voltage during 12-volt operation.	3Z6004-50.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
R55	RESISTOR, fixed: wire-wound; 40 ohms ±5%; 1″ lg x 1 3/32″ diam; JAN type #RW30F400.	R55—Drops filament voltage during 12-volt operation.	3RW15914.
R52, R53	RESISTOR, fixed: composition; 56 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF560J.	R52—Receiver filament string. R53—Receiver filament string.	3RC20BF560J.
R1, R67	RESISTOR, fixed: composition; 82 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF820J.	R1—Current indicator lamp shunt. R67—Transmitter filament voltage balance.	3RC20BF820J.
R68	RESISTOR, fixed: composition; 100 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF101K.	R68—Transmitter filament voltage balance.	3RC20BF101K.
R54	RESISTOR, fixed: composition; 100 ohms ±10%; 1 w; max body dimen 0.750″ lg x 0.280″ diam; JAN type RC30BF101K.	R54—Receiver filament string.	3RC30BF101K.
R62	RESISTOR, fixed: composition; 220 ohms ±5%; 1 w; max body dimen 0.750″ lg x 0.280″ diam; JAN type RC30BF221J.	R62—Receiver high-voltage dropping.	3RC30BF221J.
R10	RESISTOR, fixed: composition; 330 ohms ±5%; 1 w; max body dimen 0.750″ lg x 0.280″ diam; JAN type RC30BF331J.	R10—Microphone current limiting.	3RC30BF331J.
R63	RESISTOR, fixed: wire-wound; 700 ohms ±10%; 10 w; 1¾″ lg 5/16″ diam; Hard-Hindle #13/4E; Rauland #RW-2701A8.	R63—V19 voltage regulator.	3Z5370.
R15, R16, R18	RESISTOR, fixed: composition; 1500 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF152K.	R15—V6 plate and screen decoupling. R16—V7 plate and screen decoupling.	3RC20BF152K.

R39	RESISTOR, fixed: composition; 2200 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.248″ diam; JAN type RC20BF222K.	R18—V8 plate decoupling. R39—V15 plate decoupling	3RC20BF222K.
R6, R41	RESISTOR, fixed: composition; 3300 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.248″ diam; JAN type RC20BF332K.	R6—V5 plate current limiting. R41—V6 plate and screen.	3RC20BF332K.
R3	RESISTOR, fixed: composition; 4700 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF472J.	R3—V1, V2 grid	3RC20BF472J.
R8, R19, R20	RESISTOR, fixed: composition; 4700 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF472K.	R8—V5 screen R19—V9 plate and screen R20—V10 plate and screen.	3RC20BF472K.
R57, R58	RESISTOR, fixed: composition; 5600 ohms ±10%; 1 w; max body dimen 0.750″ lg x 0.280″ diam; JAN type RC30BF562K.	R57—T7 secondary buffer R58—T7 secondary buffer.	3RC30BF562K.
R7	RESISTOR, fixed: composition; 6800 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF682J.	R7—V5 grid phase shifting	3RC20BF682J.
R47	RESISTOR, fixed: composition; 8200 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF822J.	R47—V17 screen voltage divider.	3RC20BF822J.
R5, R25, R38	RESISTOR, fixed: composition; 10,000 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF103J.	R5—V4 grid R25—V11 plate voltage dropping. R38—V4 screen.	3RC20BF103J.
R9, R49	RESISTOR, fixed: composition; 22,000 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF223J.	R9—V5 grid isolating R49—V17 screen voltage divider.	3RC20BF223J.
R17	RESISTOR, fixed: composition; 22,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF223K.	R17—V8 screen	3RC20BF223K.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
R13, R33	RESISTOR, fixed: composition; 27,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF273K.	R13—J4 pin 2 isolating R33—J4 pin 1 isolating.	3RC20BF273K.
R30	RESISTOR, fixed: composition; 33,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF333K.	R30—V12 output filter	3RC20BF333K.
R4	RESISTOR, fixed: composition; 39,000 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF393J.	R4—V3 grid	3RC20BF393J.
R23	RESISTOR, fixed: composition; 39,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF393K.	R23—V11 screen voltage divider.	3RC20BF393K.
R24	RESISTOR, fixed: composition; 47,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF473K.	R24—V11 screen voltage divider.	3RC20BF473K.
R32	RESISTOR, fixed: composition; 56,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF563K.	R32—V13 grid (pin 5)	3RC20BF563K.
R26, R27	RESISTOR, fixed: composition; 100,000 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF104J.	R26—V12 discriminator load R27—V13 discriminator load	3RC20BF104J.
R22, R36	RESISTOR, fixed: composition; 100,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF104K.	R22—V11 grid R36—V8 grid (pin 4).	3RC20BF104K.
R45	RESISTOR, fixed: composition; 120,000 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ lg; JAN type RC20BF124J.	R45—V5 grid voltage divider	3RC20BF124J.

R11	RESISTOR, fixed: composition; 220,000 ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF224J.	R11—V5 grid	3RC20BF224J.
R42, R44	RESISTOR, fixed: composition; 220,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF224K.	R42—V5 grid voltage divider. R44—V16 grid (pin 4).	3RC20BF224K.
R37, R40	RESISTOR, fixed: composition; 330,000 ohms ±10%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF334K.	R37—V14 grid R40—V15 grid.	3RC20BF334K.
R12, R50	RESISTOR, fixed: composition; 470,000 ohms ±5%; ½ w; max body dimen 0.468″ lg x 0.269″ diam; JAN type RC20BF474J.	R12—Microphone input h-f audio pre-emphasis. R50—V17 plate load.	3RC20BF474J.
R21, R29, R35, R51	RESISTOR, fixed: composition; 470,000 ohms +10%; ½ w; max body dimen 0.468″ lg x 0.269″ diam; JAN type RC20BF474K.	R21—J4 pin 5A decoupling R29—V17 grid a-f filter. R35—J4 pin 5A decoupling. R51—V13 audio section plate (pin 6) dropping resistor used during alignment.	3RC20BF474K.
R43, R46	RESISTOR, fixed: composition; 1 meg ±5%; ½ w; max body dimen 0.468″ lg x 0.249″ diam; JAN type RC20BF105J.	R43—V5 grid voltage divider. R46—V5 grid voltage divider.	3RC20BF105J.
R14, R28, R34	RESISTOR, fixed: composition; 1 meg ±10%; ½ w; max body dimen 0.468″ lg x 0.269″ diam; JAN type RC20BF105K.	R14—V6 grid R28—DISCR TEST POINT decoupling. R34—J4 pin 6 decoupling.	3RC20BF105K.
R48	RESISTOR, variable (potentiometer): carbon; 10,000 ohms ±10%; linear taper; 1″ diam x $^{15}/_{32}$″ d; shaft ¼″ diam x $^{15}/_{32}$″ lg w/screw-driver slot; Stackpole #LM; Rauland #RP–103J.	R48—V17 screen voltage adjustment.	3Z7410–40.
T1	TRANSFORMER, AF: microphone; pri 8.5 ohms; secd 1300 ohms; HS shielded case; 1¾″ lg x 1″ diam; Jeffsonelec #467–001–218; Rauland #LA–0045.	T1—Microphone input	2Z9631. 269.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
T6	TRANSFORMER, AF: output; pri 25,000 ohms; secd 4000 ohms, tapped 250 ohms; HS metal case; 1.400″ lg x 1″ diam; Jeffsonelec #467–001–219; Rauland #LA–0045.	T6—Audio output	2Z9632. 381.
T5	TRANSFORMER, discriminator: 4.3 mc; output; shielded, herm sealed; adj iron cores; tuned pri and secd; 5″ lg x 1⅝″ diam o/a w/2 mtg holes; Rauland part/dwg LQ–0114; Delco part/dwg #7254065.	T5—Discriminator	2Z9643. 189.
T2	TRANSFORMER, IF: input; 4.3 mc; shielded; 3⅜″ lg x 1 5/16″ wd x 1 3/16″ d over-all; adj iron cores; Delco #7254025; Rauland #LQ–0116.	T2—First i-f	2Z9643. 190.
T3	TRANSFORMER, IF: 4.3 mc; interstage; 2d IF; shielded; adj powdered iron cores; approx 3⅜″ lg x 1 5/16″ wd x 1 3/16″ d; Rauland part/dwg LQ–0117; Delco part/dwg #7254026.	T3—Second i-f	2Z9643. 191.
T4	TRANSFORMER, IF: 4.3 mc; interstage, limiter; shielded; adj powdered iron cores; approx 3⅜″ lg x 1 5/16″ wd x 1 3/16″ d o/a; Rauland part/dwg LQ–0118; Delco part/dwg #7254027.	T4—Third i-f	2Z9643.192.
T7	TRANSFORMER, power: vibrator; pri 6 or 12 v input; output 280 v CT, 120 cyc; HS metal case; 3.305″ lg x 2 53/64″ wd x 3″ h less term; Jeffsonelec #465–001–209; Rauland #LP–0186.	T7—Vibrator power	2Z9608–56.
V12	TUBE, electron: JAN–1A3	V12—Discriminator	2J1A3.
V6, V7, V9, V10, V11, V14, V17.	TUBE, electron: JAN–1L4	V6—First r-f amplifier V7—Second r-f amplifier V9—First i-f amplifier	2J1L4.

		V10—Second i-f amplifier	
		V11—Limiter	
		V14—Crystal oscillator amplifier.	
		V17—D-c amplifier	
V8, V16	TUBE, electron: JAN–1R5	V8—Mixer	2J1R5.
		V16—Bias oscillator	
V1, V2, V3, V4, V13	TUBE, electron: JAN–3A5	V1—R-f power amplifier	2J3A5.
		V2—R-f power amplifier.	
		V3—Doubler.	
		V4—Transmitter oscillator.	
		V13—Discriminator and a-f amplifier.	
V5, V15	TUBE, electron: JAN–3Q4	V5—Reactance tube	2J3Q4.
		V15—Crystal oscillator.	
V18	TUBE, electron: JAN–6AF6G	V18—Indicator	2J6AF6G.
V19	TUBE, electron: JAN–OB/VR90	V19—Voltage regulator	2JOB3/VR90.
R64, R65	TUBE, ballast: glass; 4.0 to 4.4 v across load, 1.5 to 3.1 v drop across tube; 0.34 to 0.37 amp T–9 bulb; 3 5/16″ lg over-all; Amperite #3H–1–7.	R64—Receiver filament voltage regulator.	3Z6925–3.10.
		R65—Transmitter filament voltage regulator.	
VIB	VIBRATOR, synchronous: vibrator rectifier; input 6 v, DC, 5 amp; 3¼″ lg x 1½″ diam; Mallory #538C.	VIB—Synchronous vibrator	3H6699–11.
	VISOR: bakelite; round; 1 7/32″ ID x 1 9/32″ OD x 3 1/16″ lg; Delco #7253606; Rauland #QP–0272.	For indicator	2ZA951–19.
	WASHER, cup: brass; nickel pl; ID 7/16″ x ¼″ hole diam x 5/64″ h; Delco #7253421; Rauland #AG–3093.	For cover	6L50244BN.
	WASHER, flat: black neoprene; round; 0.160″ ID x 7/16″ OD x 1/16″ thk; Rauland #QR–0217.	For cover	2Z4866.239.
	WRENCH: setscrew; 1⅝″ lg x 7/16″ wd x 0.060″ diam over-all; "L" shaped, fluted; Bristolco #4; Rauland #AG–1630.	Tool	6RK55232.

Identification Table of Replaceable Parts for Receiver-Transmitter BC–1335—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
R31, S4	RESISTOR, variable (potentiometer): carbon; 1 meg ±20% w/switch SPST; 1 5/16" diam x 0.754" d; shaft 5/32" lg x 1/4" diam; CTS #45 series, type #W–4142; Rauland #RP–105Y.	R31—VOLUME control S4—On-off switch.	3Z7499–1.15.
	RETAINER, crystal holder: consists of bracket, spring, sleeve, two bushings, and pin; 1 3/16" lg x 1 3/16" wd x 2" h over-all; Delco #7253678; Rauland #VG2322.	Holds crystal holder	2Z7780–11.
	SEAL, water: steel; engraved "MIC"; 1 1/16" lg x 15/16" wd x 7/8" d; Delco #7253660; Rauland #AG–4015.	Seals MIC jack	2Z8273–5.
	SEAL, water: steel body; engraved "PH"; 1 1/16" lg x 15/16" wd x 7/8" d; Delco #7253664; Rauland #AG–4014.	Seals PH jack	2Z8273–6.
	SHIELD, tube: aluminum; round, open top; slot mtd; 1 3/4" lg x 0.941" diam; JAN type SOS–6.	Shields tube	2Z8308–28.
X1	SOCKET, crystal: 4 prong; molded phenolic; 1 3/16" lg x 2 3/32" wd x 1 1/16" h over-all; Cinch #9804; Rauland #SF–0199.	Socket for crystal holders	2Z8678.
	SOCKET, tube: 6 cont; bakelite body; 1 1/8" diam x 7/16" h less term; Amphenol #MIP–6.	Socket for vibrator	2Z8659–7.
	SOCKET, tube: miniature 7 pin; molded phenolic body; 1 3/32" diam x 1 7/64" h over-all; JAN type SO–10–M.	Tube socket	2Z8677.94.
	SOCKET, tube: miniature 7 pin; ceramic body; 1 3/32" diam x 1 17/64" h over-all; JAN type SO–10–C.	Tube socket	2Z8677.95.

	SOCKET, tube: octal; mica filled bakelite; body 1″ diam x ½″ less term; Cinch #6742; Rauland #ST–800X.	Tube socket	3Z8678.231.
	SPRING: flat; chart retainer; 0.016″ phosphor-bronze; 1 1/16″ lg x 3/8″ wd x 9/64″ h over-all; Delco #7253431.	Holds chart	2Z8879–56.
	SPRING: flat; grounding cont; 0.011″ spring brass; 1 39/64″ lg x 5/8″ wd x 3/8″ h over-all; Delco #7253814; Rauland #AG–3037.	Maeks ground connection	2Z8877.101.
	SPRING: flat; vibrator retainer; 0.025″ carbon steel; 1 5/8″ OD x 1 1/8″ ID x) 1 3/32″ h; Cinch #52092.	Holds vibrator	2Z8879–55.
L31, L74A, B	SUPPRESSOR, electrical noise: "A" supply; capacitor and choke coil on 0.050″ aluminum bracket; 3 15/32″ lg x 1 3/64″ wd x 1 3/8″ h over-all; 6 amp, 3 v DC; 3½ amp, 14 v DC; Delco #7253767; Rauland #VG–2316.	L31—Battery line noise filter. L74A—Battery line noise filter. L74B—Battery line noise filter.	3Z1891–21.3.
S3A, B, C	SWITCH, lever: two position, nonlocking; cont arrangement position #1, 1A2B, position #2, 2B1A; bakelite insulation; 1 7/8″ lg x 5/8″ wd x 2¼″ h over-all; Centralab #N7806XT.	S3—ALIGN-OPERATE switch.	3Z9580–2.2.
S5A, B, C	SWITCH, rotary; 4 SPST, 5 pole, two position; three sect; cont arrangement #1, 2A2B–2A2B–2A and shorting position; position #2, 2B2A–2B1A; bakelite insulation; 4 3/32″ lg x 1 15/16″ wd x 1¾″ h over-all; nonlocking; Mallory type #RM.	S5—6V–12V switch	3Z9825–55.77.
S2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2J.	SWITCH, slide: 2 position; nonlocking; position #1, 9A9B, position #2, 9B9A; bakelite insulation; 9 27/64″ lg x 2 1/8″ wd x 1½″ h over-all; Oak #5850.	S2—CHANNEL switch	3Z9835–4.4.
S1A, B	SWITCH, toggle: DPST; bakelite body; 3 amp, 250 v; body dimen 1 5/32″ lg x 1 1/16″ wd x 31/32 h; C–H #8370K1; Rauland #X–0239.	S1—ALIGN 5 AND 6—ALIGN OTHERS switch.	3Z9849.12.

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TECHNICAL MANUAL

RECEIVER-TRANSMITTERS BC–1335 AND BC–1335–A

CHANGES No. 2

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *15 September 1950*

TM 11–879, 23 April 1945, is changed as follows:

The title of the manual is changed to read: **RECEIVER-TRANSMITTERS BC–1335 AND BC–1335–A.**

The date line on the cover of the manual and on the title page is changed to read: 23 April **1945.**

1. General

a. DESCRIPTION (superseded).

(1) *Early models.* Receiver-Transmitter BC–1335 (figs. 1 and 1.1) is a low-power, 18-tube (plus voltage regulator), f-m (frequency-modulated) combination transmitter and receiver incorporated as a single unit. A vibrator rectifier operating from a 6- or 12-volt source is also incorporated in the unit to allow operation from any 6- or 12-volt d-c (direct-current) source capable of supplying sufficient current. An *electric eye* indicator tube is provided to assist in presetting and testing the receiver-transmitter without extra metering equipment. Both transmission and reception are crystal-controlled. Receiver-Transmitter BC–1335 is designed to operate with any one of four antennas which are provided with proper connections and attachments to fit them to antenna connectors on the unit. Two phone jacks are provided to allow simultaneous use of two headsets.

(2) *Later models.* Receiver-Transmitter BC–1335–A is substantially the same as Receiver-Transmitter BC–1335; it has been procured on Orders No. 10273–Phila–49 and 26428–Phila–49. The differences that are incorporated in the A model allow it to use an alternate power source. A connector on the front panel (figs. 1 and 1.1) and a toggle switch (marked BA–70–VIBR. and shown as S–6 on figure 42.1), accessible when the top cover is removed,

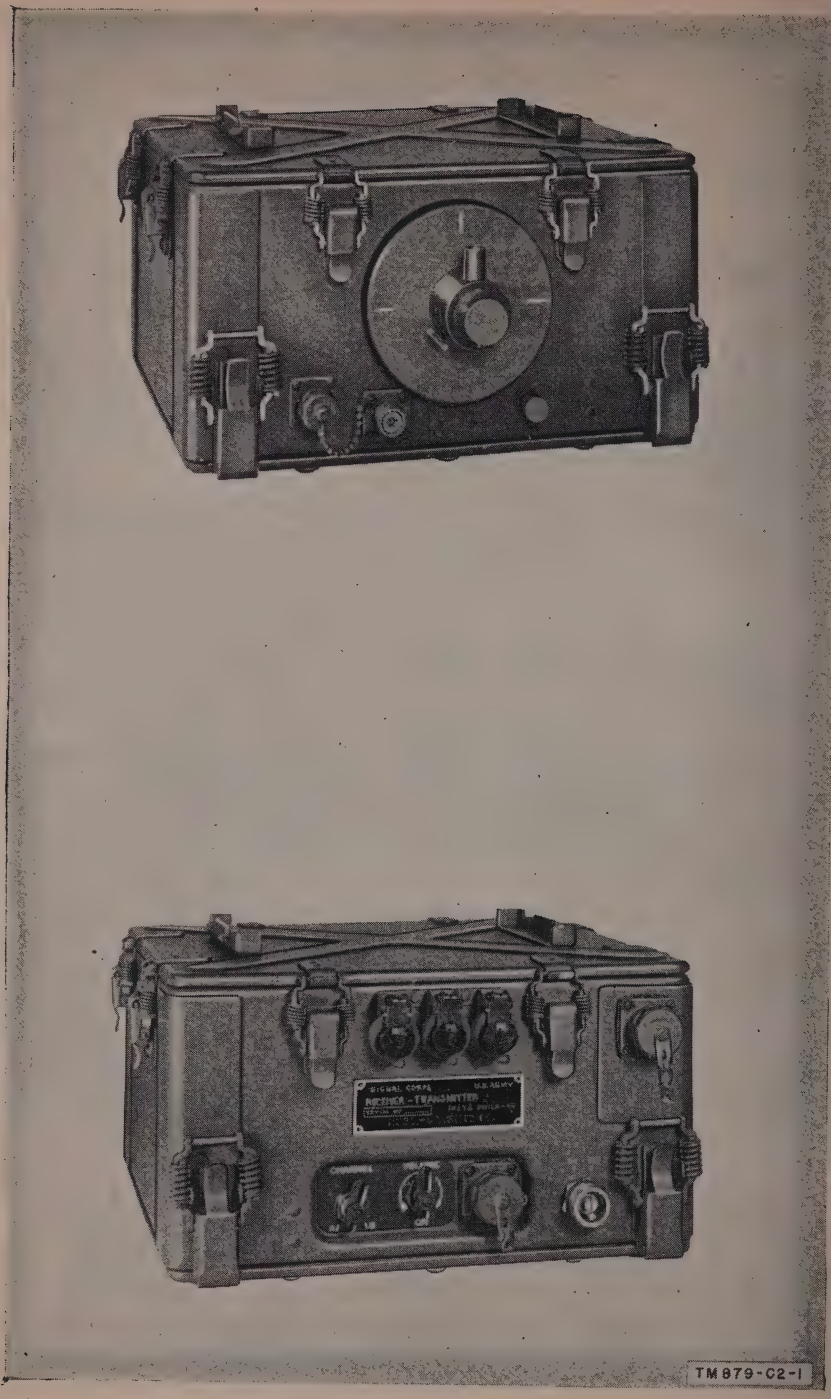


Figure 1.1 (added). Receiver-Transmitter BC–1335–A, rear and front views.

have been provided for use with dry Battery BA–70 as an alternate power source to the 6- and 12-volt sources. The vibrator power supply in the receiver-transmitter is not used when Battery BA–70 is the power source.

* * * * * * *

c. USE. In vehicular use, Receiver-Transmitter BC–1335 is connected to the vehicular battery **directly or** through Battery Charger PE–219 **(figs. 3 and 3.1A). When** the receiver-transmitter is installed in 24-volt **system** vehicles, **it** is connected to a 6-volt portable battery **or through Battery Charger PE–219 or Dynamotor DY–44/U, which are powered by the 24-volt vehicular battery.** The 6-volt batteries * * * antenna binding post. In pack use **(fig. 3.1C)**, the set may be operated from one 6-volt storage battery **(or Battery BA–70 in later models)**; it uses either the 12-foot field antenna or the 56-inch combat antenna (connected to Mast Base MP–74). An emergency antenna * * * a chest set.

d. NOMENCLATURE. Throughout this manual * * * -C, and -D. **All items referring to Receiver-Transmitter BC–1335 are applicable to Receiver-Transmitter BC–1335–A, except where otherwise noted.**

Figure 2. Receiver-Transmitter BC–1335, front and rear views ***of early models.***

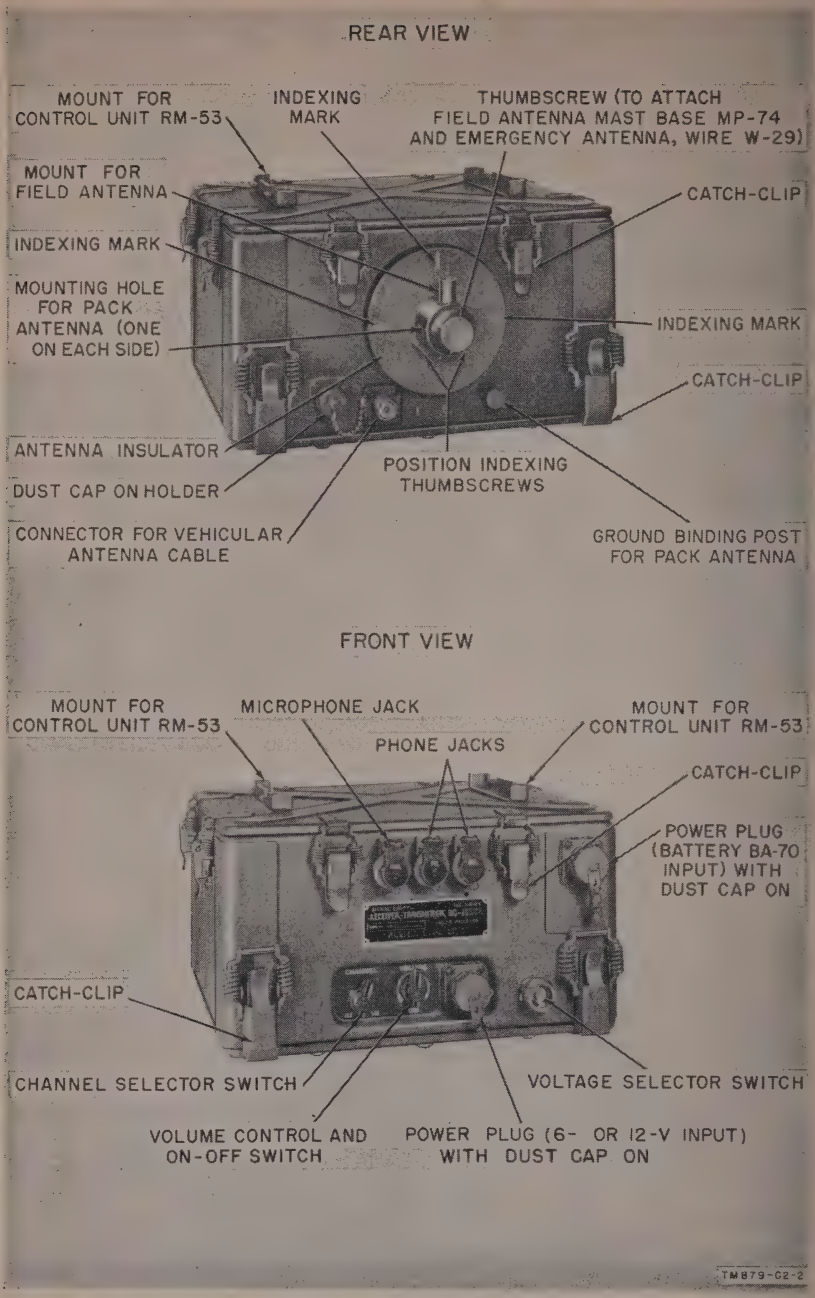


Figure 2.1 (added). Receiver-Transmitter BC–1335–A, front and rear views.

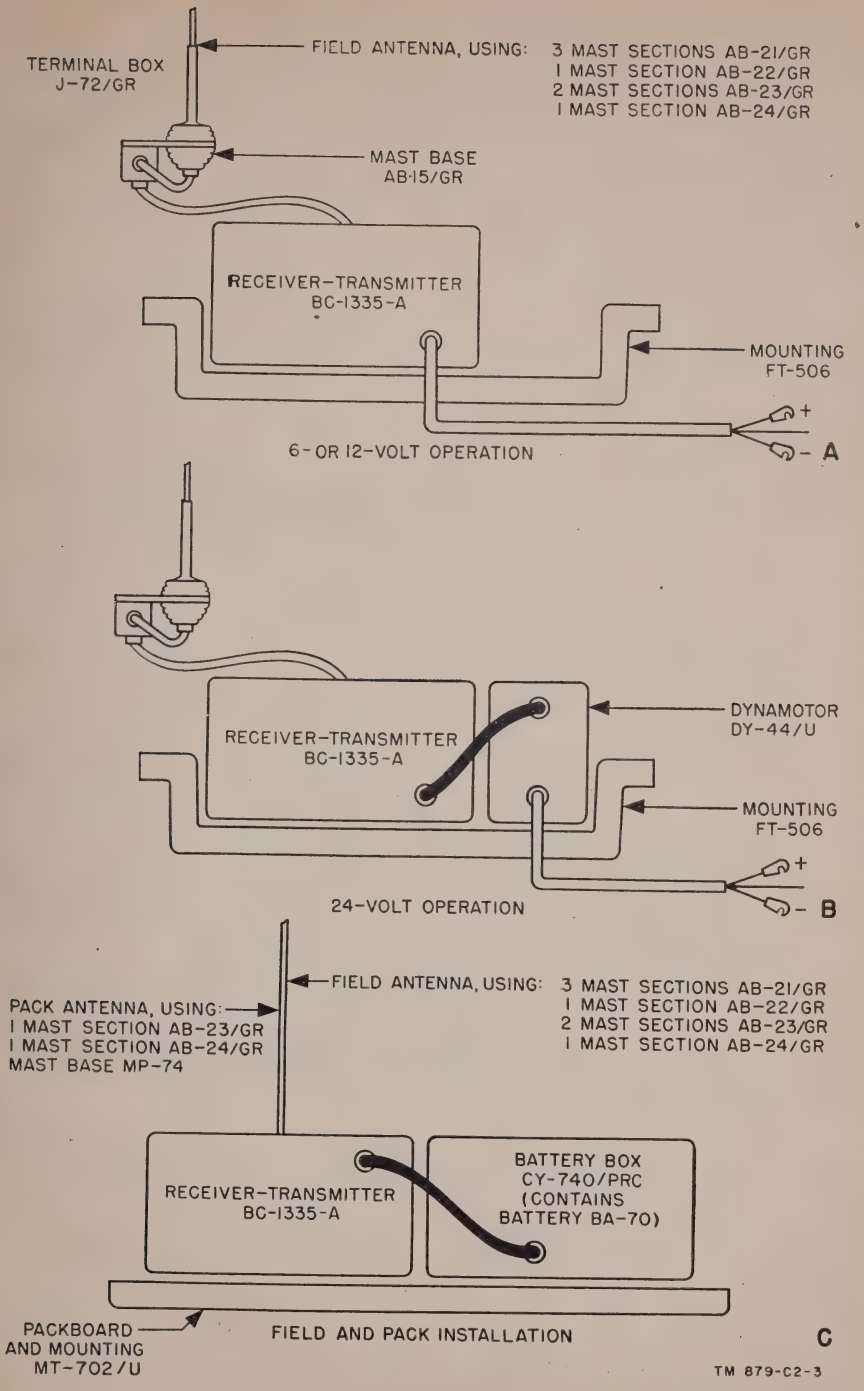


Figure 3.1 (added). Receiver-Transmitter BC–1335–A, simplified block diagram of usage in Radio Set SCR–619.

3. Technical Characteristics

a. TRANSMITTER CIRCUIT.

* * * * * * *

Power input:

6-volt ..... 6 amp

12-volt ..... 3½ amp

Battery BA–70:

4½-volt ..... 770 ma (milliamperes)

90-volt ..... 39.5 ma

150-volt ..... 98 ma

* * * * * * *

Power supply ..... 6- or 12-volt battery **or Dynamotor DY–44/U with 24-volt storage battery ("A" model may also use Battery BA–70)**

* * * * * * *

b. RECEIVER CIRCUIT.

* * * * * * *

Power input:

6-volt ..... 3.5 amp

12-volt ..... 2.5 amp

Battery BA–70:

4½-volt ..... 425 ma

90-volt ..... 36.5 ma

150-volt ..... 0 ma

Power supply ..... 6- or 12-volt battery **or Dynamotor DY–44/U with 24-volt storage battery ("A" model may also use Battery BA–70)**

* * * * * * *

Figure 5. Receiver-Transmitter BC–1335, accessories. ***(Cord CD–1294 is not required for use with Receiver-Transmitter BC–1335–A.)***

6. Shipping Weights and Dimensions of Packed Sets (Early Models)

* * * * * * *

6.1 Shipping Weights and Dimensions of Packed Sets (A Model)

(Added)

Receiver-Transmitter BC–1335–A is packed in a double corrugated carton with a moisture-vaporproof barrier around the inside carton (fig. 8.1). The packaged unit is 14 inches wide by 16 inches deep by 10 inches high and weighs approximately 26 pounds. For export, the set is packed in a wooden crate which holds nine separate cartons. These cartons contain the components of Radio Set SCR–619.

7. Description of Components

* * * * * * *

b. RECEIVER-TRANSMITTER BC–1335. The receiver-transmitter is * * * with 12 screws. At each bottom corner of the cabinet is a catch-clip for mounting the receiver-transmitter on Mounting **FT–505**, Mounting FT–506, **or Mounting MT–702/U.**

c. CRYSTAL HOLDER FT–243. Each of the * * * the receiver-transmitter. **In Radio Receiver and Transmitter BC–659–(*) and Receiver-Transmitters BC–1335 and BC–1335–A, Crystal Holder FT–243 with crystal is used. The channel frequencies and Signal Corps stock Nos. are identical; therefore, crystals marked for either of these sets may be used interchangeably in either equipment.**

8. Unpacking, Uncrating, and Checking (Early Models)

* * * * * * *

8.1. Unpacking, Uncrating, and Checking (A Model)

(Added)

Unpack the receiver-transmitter carefully (fig. 8.1) and inspect for possible damage during shipment. The receiver-transmitter is shipped with a complete set of tubes and crystals installed. To unpack, proceed as follows:

a. Open the outer carton with a knife or another sharp instrument.

b. Open the vaporproof barrier.

c. Open the inner carton with a knife or another sharp instrument.

d. Remove the bags of desiccant on top of the top pad.

e. Remove the top pad.

f. Remove the cells at front and rear that protect the control panel and antenna post, and remove the lines that hold the unit in the carton.

g. Take the unit out of the inner carton.

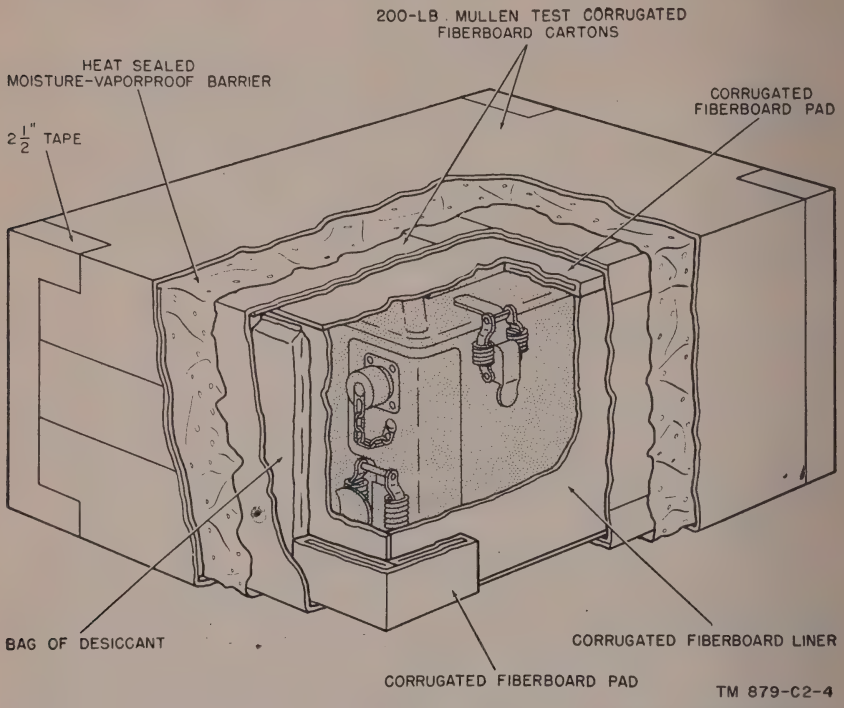


Figure 8.1 (added). Receiver-Transmitter BC–1335–A, packing and packaging.

9. Connections and Interconnections

Caution (added): For Receiver-Transmitters BC–1335–A, Orders No. 10273–Phila–49 and 24628–Phila–49, do not throw the BA–70–VIBR. switch to the BA–70 position when the radio set is connected to a 6- or 12-volt supply or to Dynamotor DY–44/U; this will damage the tube filaments.

* * * * * * *

10. Installation

Receiver-Transmitter BC–1335 is * * * in TM 11–619. If Receiver-Transmitter BC–1335 is to be used as a pack unit, install

it on a packboard with Mounting FT–505 **or Mounting MT–702/U.** It is held * * * to TM 11–619.

11. Repacking

To repack Receiver-Transmitter BC–1335, reverse the operations outlined in paragraphs 8 **and 8.1** as far as available materials will allow.

12. Controls and Their Use

a. GENERAL. Receiver-Transmitter BC–1335 is * * * is on receiving.

(1) *Volume control.* The VOLUME control is also the on-off switch for the receiver-transmitter **except when Battery BA–70 is used.** When the control * * * indicating the receiver-transmitter is turned off. **The "A" model sets also have an internal switch which can be set to permit the use of Battery BA–70 (dry battery) as the power source. When Battery BA–70 is used, the on-off switch of the VOLUME-ON control on the receiver-transmitter is inoperative and the set is turned on or off by means of the ON-OFF switch on the battery box.**

* * * * * * *

(4) (Added.) *BA 70–VIBR. switch.* The BA–70–VIBR. switch is a four-pole double-throw toggle switch which is accessible when the top cover of the receiver-transmitter is removed. It provides a means of changing the internal connections of the receiver-transmitter for Battery BA–70 operation or for 6- or 12-volt operation. This switch is not incorporated in early models of the receiver-transmitter.

* * * * * * *

13. Starting Procedure

Note (added). See caution in paragraph 9.

After Receiver-Transmitter BC–1335 has been properly sited and installed (TM 11–619) with antenna and **power source connected,** it is ready to operate.

* * * * * * *

b. Turn VOLUME control in direction of arrow. A slight click will be heard after the control has been turned approximately 20°, indicating that the set is on **(if a 6- or 12-volt power source (or a 24-volt source and Battery Charger PE–219) is used). If Battery**

BA–70 is used, place the switch on the battery box in the ON position. With a 24-volt power source, the switch on Dynamotor DY–44/U is used.

15. Stopping Procedure

(Superseded)

To turn off Receiver-Transmitter BC–1335 when a 6- or 12-volt power source is being used, turn the VOLUME (or VOLUME-ON) control to the left as far as it will go; a click will indicate that the set is turned off. If Battery BA–70 is used, turn off the set by turning the external switch on the battery box to the OFF position. When a 24-volt power source is used, turn off the set by using the switch on Dynamotor DY–44/U.

17. Equipment Performance Check List

	Item No.	Item	Action or condition	Normal indications	Corrective measures
*	*	*	* *	*	*
START	5	VOLUME (or VOLUME-ON) control or ON-OFF switch on battery box.	Turn full on in clockwise direction. **If Battery BA–70 is being used, turn ON-OFF switch on Battery Box CY–740/PRC to ON.**	Loud rushing noise heard in headset.	Check power connections. Check fuse. Check that alignment switch is in ALIGN OTHERS position. **If applicable, check setting of BA–70–VIBR. switch.**
*	*	*	* *	*	*
STOP	8	VOLUME (or VOLUME-ON) control or ON-OFF switch on battery box.	Turn fully counterclockwise **or turn ON-OFF switch on battery box to OFF.**	**Click** is heard; **noise in headset stops.**	

19. Description of Preventive Maintenance Techniques

* * * * * * *

c. INSPECT. Inspection is the * * * the following conditions:

* * * * * * *

(2) Placement, by observing that all **leads** and cabling are in their original positions.

* * * * * * *

53. Receiver-Transmitter BC–1335

* * * * * * *

d. MASKING (figs. 14 and 15).

(1) *Top.*

* * * * * * *

(*o*) (Added.) Mask BA–70–VIBR. switch, if applicable.

* * * * * * *

55. Auxiliary Equipment

(Superseded)

a. REMOTE CONTROL EQUIPMENT RC–261. For information on this equipment, refer to TM 11–2632.

b. DYNAMOTOR DY 44/U. This is an alternative power supply consisting of a 24-volt motor and a 12-volt generator arranged as a single unit. For further details on Dynamotor DY–44/U, refer to TM 11–5035.

Figure 16. Receiver-Transmitter BC–1335, complete block diagram ***of early models.***

56. Treatment of Theory

The functional theory * * * in two ways. The first is a condensed circuit analysis keyed to a block diagram (figs. 16 **and 16.1**) which shows signal paths. It can be * * * in Receiver-Transmitter BC–1335.

61. Crystal Oscillator

* * * * * * *

b. Plate voltage on * * * for triode operation. Rectified grid current flows through resistor R–40, which is connected between control grid and ground, providing grid bias **for the proper operation of** the **oscillator** tube.

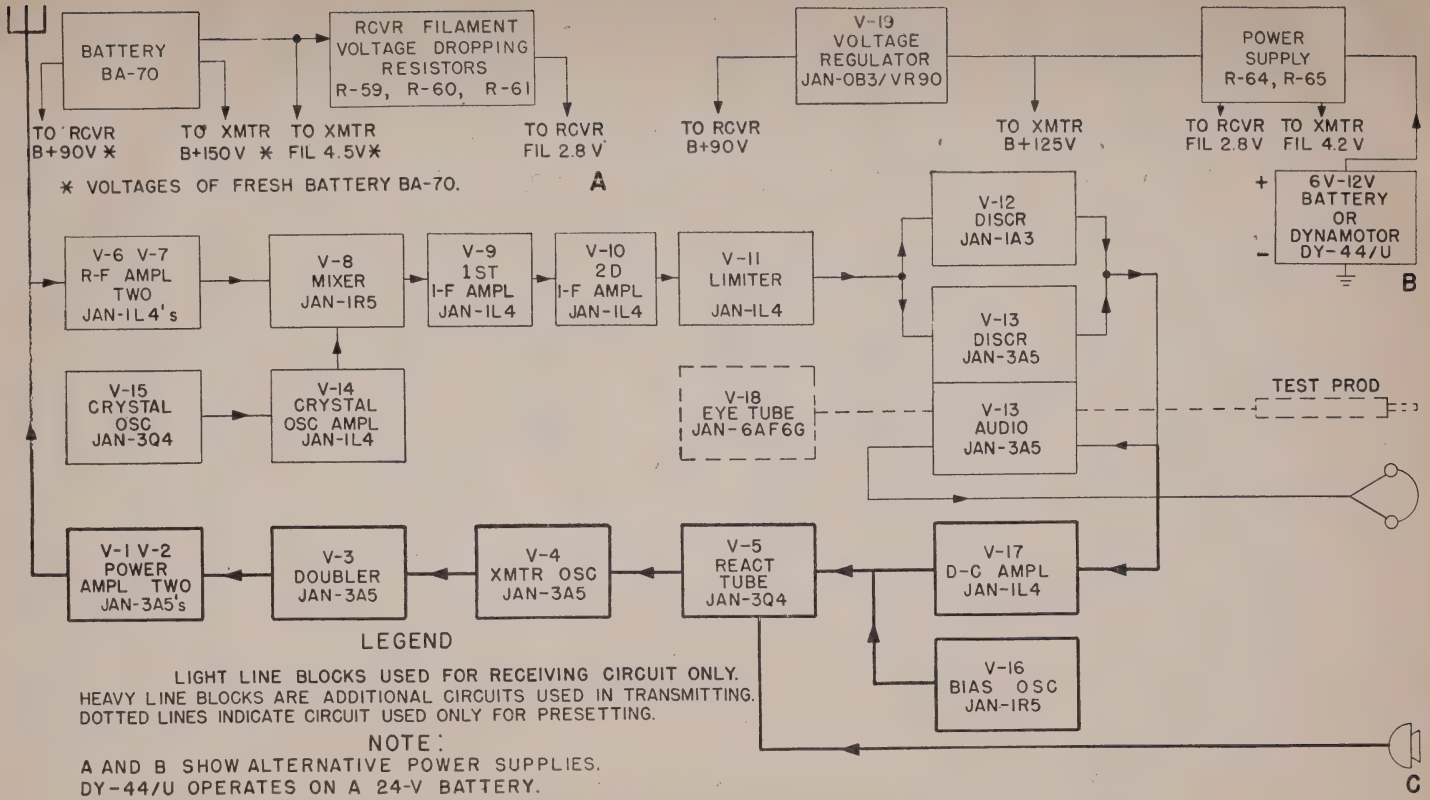


Figure 16.1 (added). Receiver-Transmitter BC-1335-A, complete block diagram.

Figure 35. Receiver-Transmitter BC–1335, high-voltage supply ***in early models.***

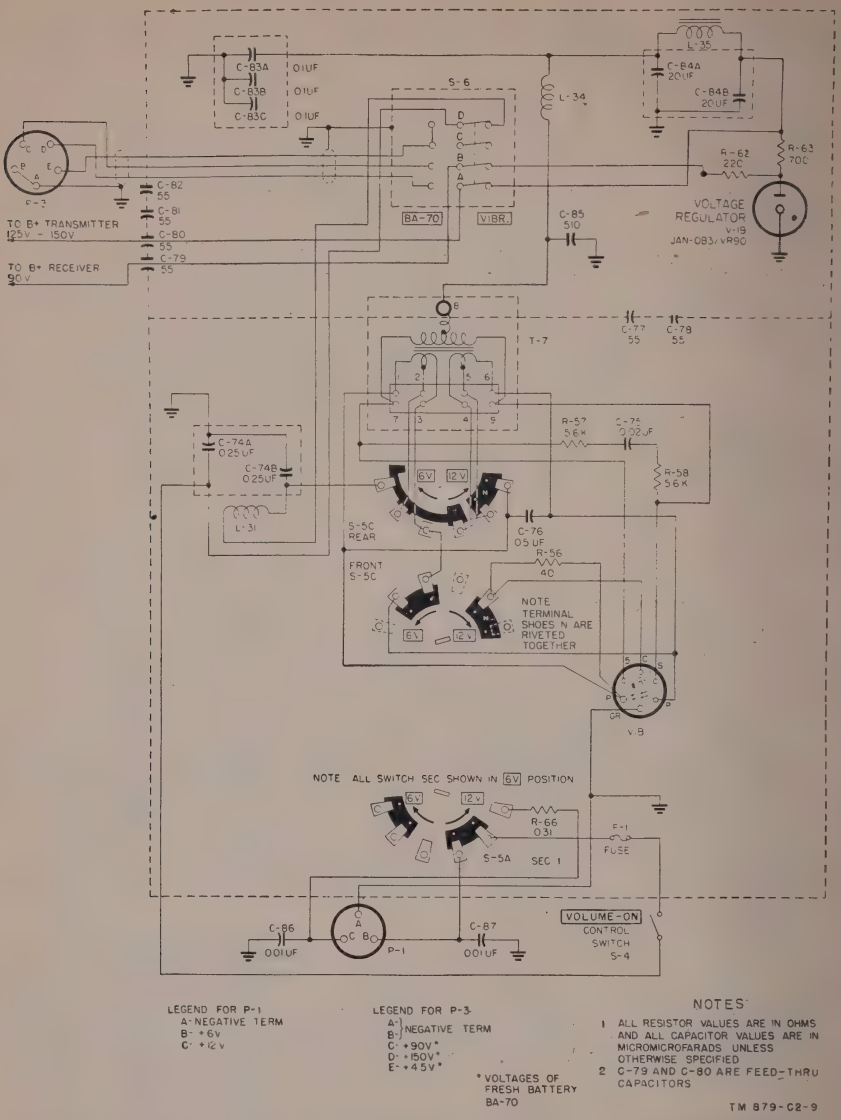


Figure 35.1 (added). Receiver-Transmitter BC–1335–A, schematic diagram of high-voltage supply.

76.1 Power Supply for Sets Using Battery BA–70
(Added)

a. Receiver-Transmitter BC–1335–A is equipped with switch S–6 (fig. 35.1), which permits the use of a dry battery power supply (Battery BA–70). When switch S–6 is in the BA–70 posi-

tion, connector P–3 is connected directly to the receiver-transmitter circuits and the vibrator power supply is disconnected (fig. 35.1). Connector P–3 receives the cable of Battery Box CY–740/PRC which contains Battery BA–70. Pins A and B of P–3 are paralleled and connected to the common negative circuit and to ground. Pin C is at 90 volts, pin D at 150 volts, and pin E at 4½ volts potential, when the dry battery is fresh. See figure 36.1 for a simplified filament schematic diagram.

b. When switch S–6 is in the VIBR. position, the vibrator power supply is connected to the receiver-transmitter circuits and the power supply circuits operate as described in paragraph 76.

77. Filament Circuit

a. The filament circuits (figs. 36 **and 36.1**) make use of two voltage regulator resistors (R–64 and R–65) mounted in tube envelopes with the number 3H–1–7 stamped on the base. These resistors are * * * is in operation.

* * * * * * *

Figure 36. Receiver-Transmitter BC–1335, filament supply ***circuit of early models.***

77.1 Filament Circuit for Sets Using Battery BA–70 (Added)

a. When switch S–6 on Receiver-Transmitter BC–1335–A is in the BA–70 position, connector P–3 is connected directly to the receiver-transmitter circuits (fig. 36.1). Voltage regulator resistors R–64 and R–65 are disconnected from the circuit. The 4.5 volts on pin E of connector P–3 is connected to the transmitter filament string. This voltage (4.5 volts) is also applied to the receiver filament string through receiver filament voltage-dropping resistors R–59, R–60, and R–61 in parallel. These resistors drop the voltage to 2.8 volts.

b. When switch S–6 is in the VIBR. position, the filament circuit operates as described in paragraph 77.

82. Preliminary Steps With Cover On

Before removing the * * * the following items:

* * * * * * *

b. VOLUME CONTROL AND SWITCHES (superseded). Be certain the 6V–12V voltage selector switch and the BA–70–VIBR. switch (if used in the equipment) are in the proper positions for the power supply used. Be certain that the VOLUME control is on and turned fully clockwise. If Battery BA–70 is used, make certain that the switch on the battery box is turned on. If Dynamotor DY–44/U is used, make certain that the switch on its front panel is closed.

* * * * * * *

d. BATTERIES. Make sure the * * * at least half-charged. **If Battery BA–70 is used as the power supply, make sure that the battery is delivering rated voltage. Check that all connectors are tight and not corroded.**

* * * * * * *

83. Preliminary Steps With Cover Off

If the trouble * * * for further checks.

* * * * * * *

c. FUSE AND VIBRATOR. Turn the set * * * further trouble shooting. **In "A" models, if trouble in the vibrator power supply is suspected, check the operation of the set while using Battery BA–70. If the set operates satisfactorily on Battery BA–70, then the fault is in the vibrator power supply.**

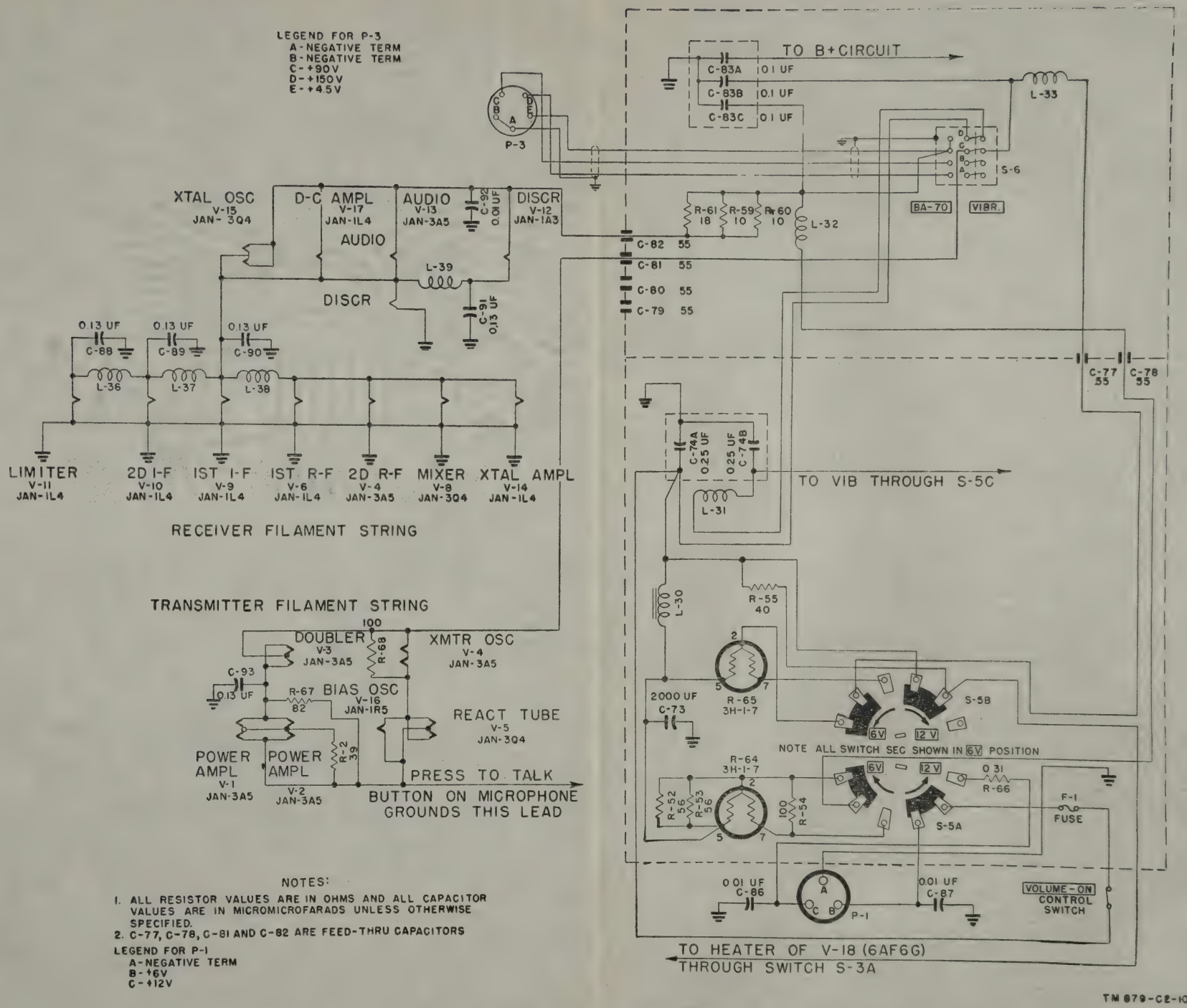


Figure 36.1. Receiver-Transmitter BC–1335–A, filament supply circuit schematic diagram.

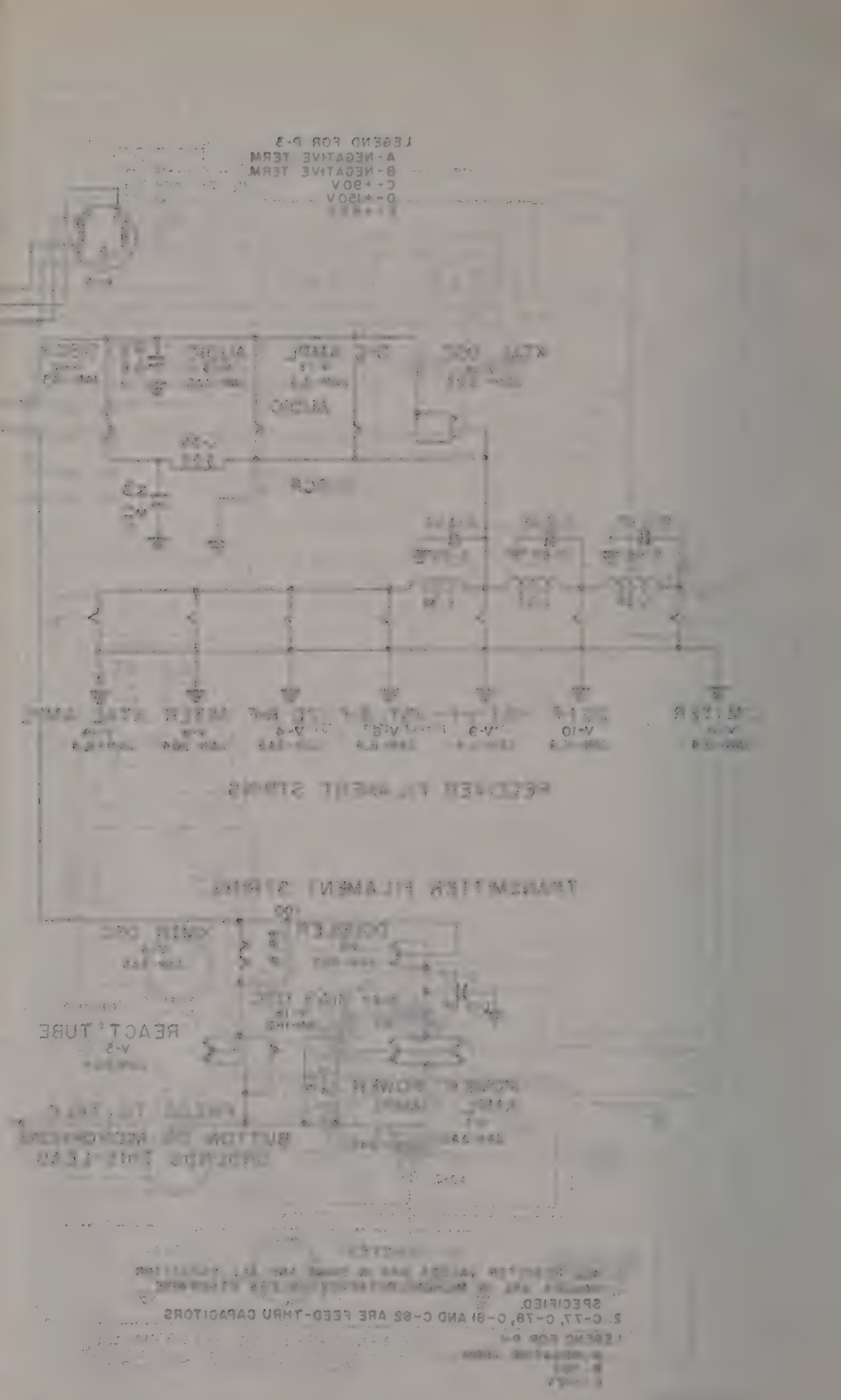


Figure 42. Receiver-Transmitter BC–1335, top view ***of early models.***

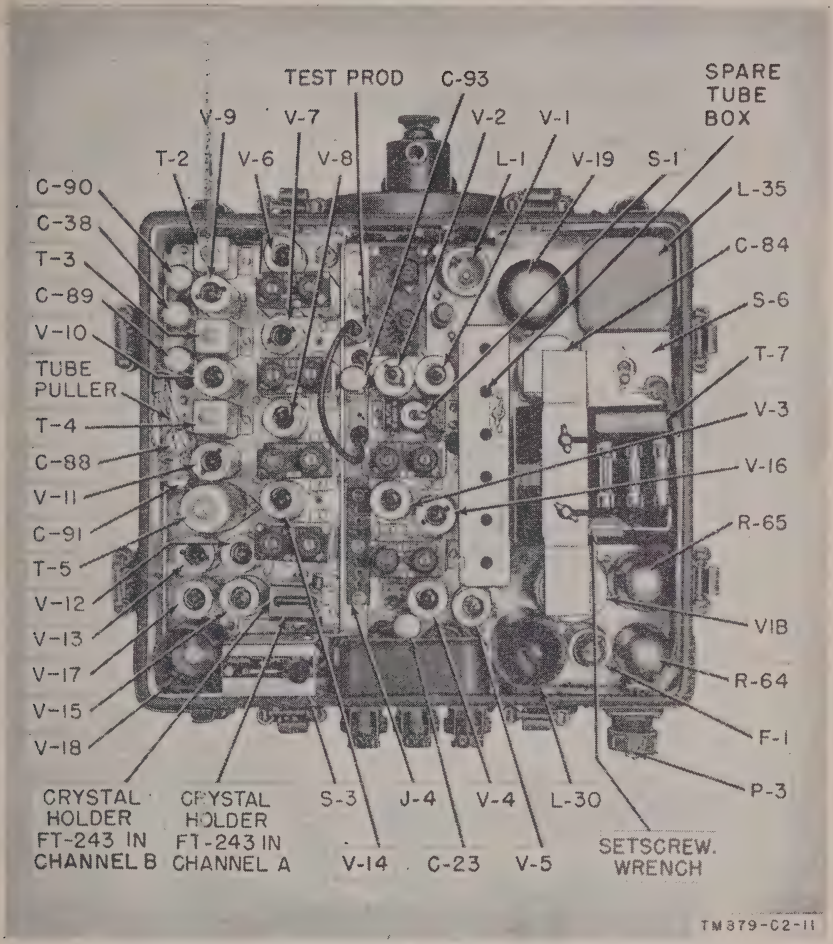


Figure 42.1. Receiver-Transmitter BC–1335–A, top view.

85. Sectionalizing Trouble in Receiver Section

Symptoms	Probable trouble	Corrections
* *	* * *	* *
2. Receiver dead.	2. 6V-12V + switch in wrong position. Open circuit in cable connector assembly. **BA–70 – VIBR. switch in wrong position.**	2. Throw switch for correct battery voltage. Repair or replace. **Throw switch to correct position.**
* *	* * *	* *
15. Excessive noise and weak signals with dry battery supply.	**15. Low battery voltage.**	**15. Replace battery.**

87. Localizing Trouble in Power Supply Section

Symptoms	Probable trouble	Corrections
1. Plate supply dead. * * * or filament voltage.	1. Fuse blown; vibrator * * * in wrong position. **BA–70 – VIBR. switch in wrong position.**	1. Replace. Check continuity. * * * to proper position. **Throw switch to proper position.**
* *	* * *	* *
3. No B+ voltages * * * sound from vibrator.	3. L–31 open. Poor * * * Defective transformer T–7. **Poor contacts in switch S–6.**	3. Check continuity. Check * * * T–7 if necessary. **Replace.**
* *	* * *	* *

90. Voltage Checks at Test Strip

In these checks * * * any variation carefully.

a. Connect the receiver-transmitter to a **power source.**

* * * * * * *

98. Alinement of Receiver I–f Amplifier and Discriminator Using Maintenance Equipment ME–13–( )

* * * * * * *

b. **Aline,** using the following procedure:

Note. Maintenance Equipment ME–13–( ) * * * serves equally well.

* * * * * * *

(8) Connect voltmeter probe * * * for 0 volts. **The meter should reverse in polarity as secondary adjustment is varied to either side of the zero current point.**

* * * * * * *

(10) Check secondary of * * * bottom sealing cap. **Set transmitter switch to ALINE OTHERS.**

* * * * * * *

c. (Added) If alinement of i-f amplifiers is completely out of adjustment, proceed as follows:

(1) Perform operations in paragraph 98*a* (1) through (4) and paragraph 98*b* (1) through (3).

(2) Connect the ungrounded lead of Oscillator VO–4 to pin 6 of tube V–10.

(3) Loosen locknuts on top and bottom adjustments of transformers T–2, T–3, and T–4 just enough so that a slight drag is felt when the adjustment screw is turned.

(4) Insert meter probe in pin 5A of test strip J–4. Adjust secondary (bottom) and primary (top) of i-f transformer T–4 for maximum voltage on the voltmeter.

(5) Connect ungrounded lead of Oscillator VO–4 to pin 6 of tube V–9.

(6) Adjust secondary (bottom) and primary (top) of i-f transformer T–3 for maximum meter reading.

(7) Connect ungrounded lead of Oscillator VO–4 to pin 6 of tube V–8.

(8) Adjust secondary (bottom) and primary (top) of i-f transformer T–2 for maximum meter reading.

(9) Readjust primaries and secondaries of transformers T–2, T–3, and T–4. Keep signal input to receiver as weak as possible.

(10) Proceed as in paragraph 98*b* (8) through (11).

99. Calibration and Neutralization Using Maintenance Equipment ME–13–( )

* * * * * * *

l. Place probe of * * * microphone press-to-talk switch. Back out r-f adjustment screw in SETTING NO. **6B** for maximum

indication. Throw CHANNEL switch * * * noise in headset. Throw CHANNEL switch to B and adjust SETTING NO. 3B, NO. 4B, and NO. 7B as above.

* * * * * * *

101. Calibration Using Test Circuits in Receiver-Transmitter BC–1335

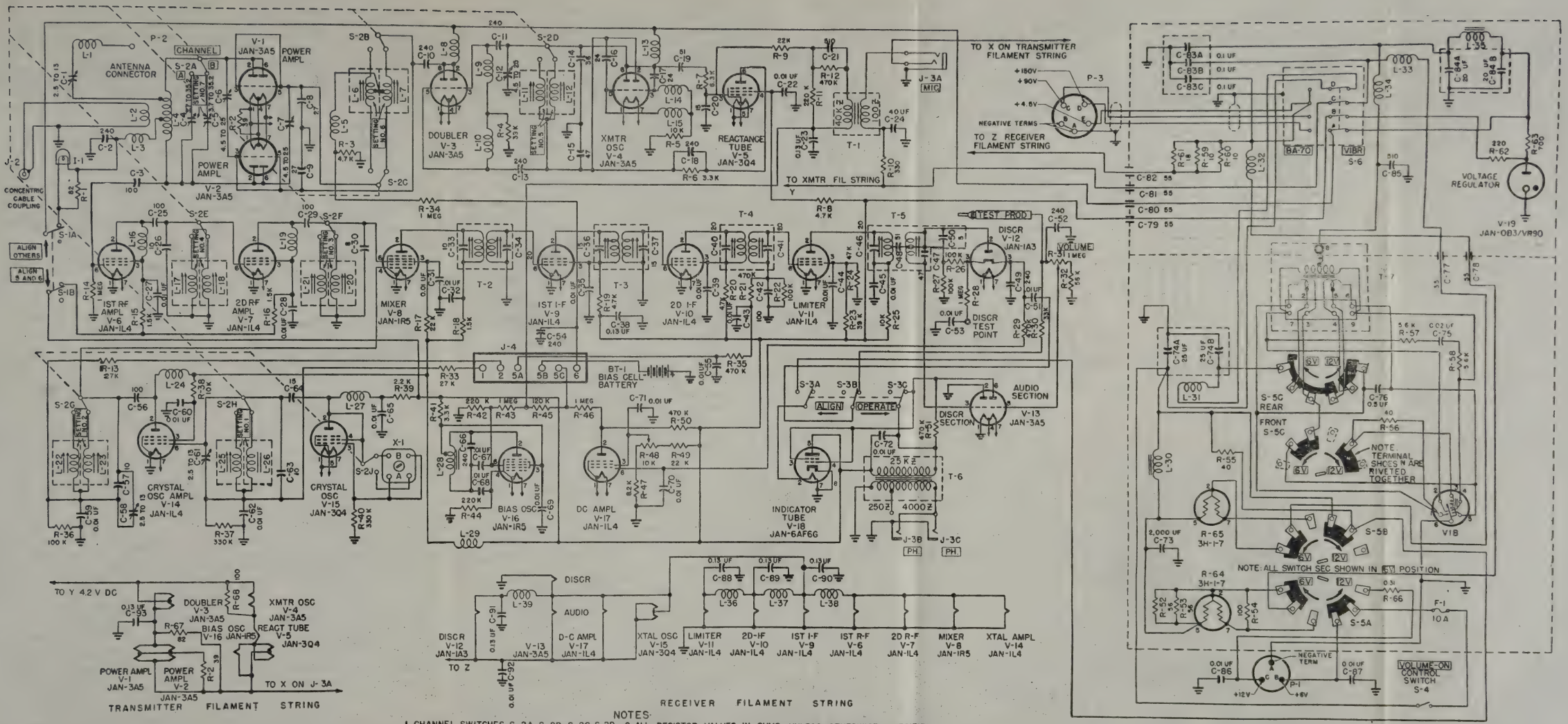
* * * * * * *

Section XV. PRESETTING

102. Preliminary Instructions

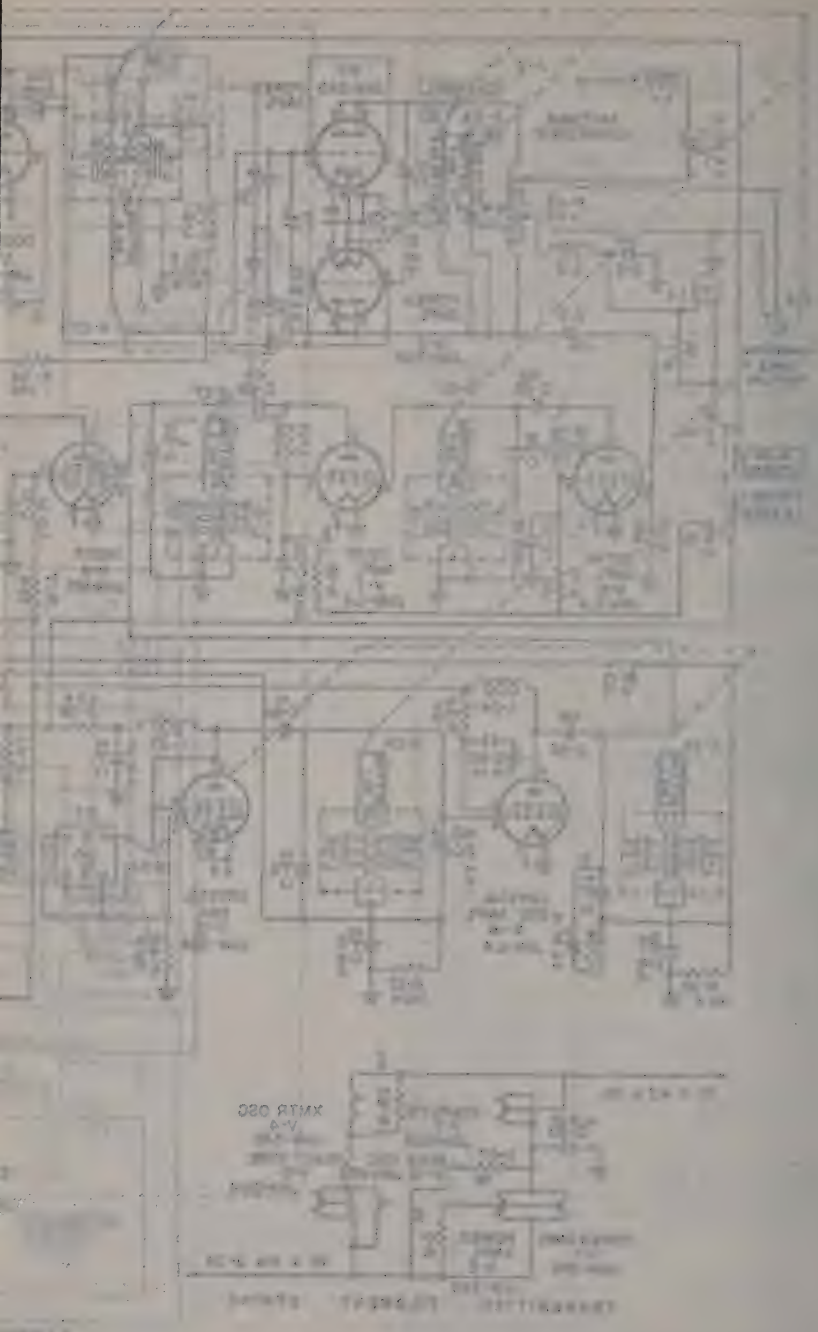
* * * * * * *

Figure 61. Receiver-Transmitter BC–1335, complete schematic diagram ***of early models.***



NOTES:
1. CHANNEL SWITCHES S-2A, S-2B, S-2C, S-2D, S-2E, S-2F, S-2G, S-2H, S-2J SHOWN IN B POSITION
2. ALL RESISTOR VALUES IN OHMS UNLESS OTHERWISE SPECIFIED
3. ALL CAPACITOR VALUES IN UUF UNLESS OTHERWISE SPECIFIED
4. C-77 THRU C-82 ARE FEED-THRU CAPACITORS.

Figure 62 (added). Receiver-Transmitter BC–1335–A, complete schematic diagram.



APPENDIX

IDENTIFICATION TABLE OF PARTS

1. Requisitioning Parts

The fact that * * * for requisitioning it. Requisitions must cite an authorized basis, such as **T/O&E,** TA, T/BA, SIG 6, **SIG 7&8,** SIG 7–8–10, SIG 10, list of allowances of expendable material, or **another** authorized supply basis. **The Department of the Army Supply Catalog applicable to the equipment covered in this manual is SIG 7&8–SCR–619. For an index of available supply catalogs in the Signal portion of the Department of the Army Supply Catalog, see the latest issue of SIG 1, Introduction and Index.**

2. Identification Table of Parts for Receiver-Transmitters BC–1335 and BC–1335–A

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	RECEIVER-TRANSMITTER BC–1335–A: vehicular and transportable; FM; output 1.8 w; freq 27 to 38.9 mc; input 6 or 12 v DC; Sig C spec #271–3096.	Transmits and receives voice radio signals.	2C5395–1335.
	TECHNICAL MANUAL: TM 11–879	Describes equipment	(Order through AGO channels.)
Figs. 42 and 42.1.	**BRACKET ASSEMBLY: vibrator and capacitor hold-down bracket; aluminum; 2 felt pads 1″ lg x ⅞″ wd x 3/16″ thk at ends; 5½″ lg x 1½″ wd x 1″ deep overall; irregular shape; 2 cut-outs on 1½″ ctrs for mtg; Delco #7253780 (modified); Hubbell & Miller #M0012.**	**Secures vibrator and C84**	**2Z1244–45.**
	CABLE ASSEMBLY, special purpose: four #18 AWG cond ea comprising 26 #32 AWG strands; cloth-covered; round, ¼″ diam; approx 7″ lg w/rubber boot 3⅛″ lg x 1¼″ wd x 1⅜″ h cemented to one end, other end stripped and tinned; Delco #7254292; Rauland #VW–0603; **Hubbell & Miller #323.**	A-f cable	**3E7270.**
*	* * *	* *	*
C22 * * * C92.	CAPACITOR, fixed: **mica;** 10,000 mmf ± 10%; **300** vdcw; JAN type **CM35B103K.**	C22–V5 screen bypass * * * filament string bypass.	**3K3510321.**
*	* * *	* *	*
C83A, B, C.	CAPACITOR, fixed: paper; three sect; 100,000 mmf **+20–10% ea sect;** 600 vdcw **ea sect;** JAN type **CP54B5EF104V.**	C83A–High-voltage * * * C83C–Receiver filament string r-f filter.	**3DA100–732.**

C23 * * * C93.	CAPACITOR, fixed: paper; 130,000 mmf +30%–10%; 100 vdcw.	C23—T1 secondary a-f * * * filament string bypass.	**3DA130–9.**
C76.	CAPACITOR, fixed: paper; 500,000 mmf **+20–10%**; 600 vdcw; **JAN type CP53B1EF504V.**	T7 primary buffer	**3DA500–451.**
*	* * *	* *	*
C24.	CAPACITOR, fixed: **electrolytic; 50** mf; 25 vdcw; **JAN type CE63C500F.**	Microphone circuit a-f bypass.	**3DB50–74.**
*	* * *	* *	*
C1, C58, C61.	CAPACITOR, variable: ceramic; **3** to **12** mmf; **JAN type CV11A120.**	C1—Antenna coupling * * * C61—V14 grid tuning.	**3D9012V–19.**
C4, C5.	CAPACITOR, variable: air; **plate meshing type: +5 to 42** mmf; **JAN type CT1E040.**	V1, V2 plate tuning	**3D9042V–8.**
*	* * *	* *	*
C12.	CAPACITOR, variable: ceramic; **4** to **30** mmf; JAN type **CV11D300.**	V4 plate tuning	**3D9030V–23.**
	CASE: spare crystal holder assembly; aluminum; 3-19/32″ lg x 2″ wd x 1-9/32″ h overall; 2 felt strips 3-9/16″ lg x ¼″ wd x 3/32″ thk on bottom for cushioning; inside hinged cover; wingnut locking; holds 4 Crystal Holders FT–243; 4 mtg holes on 2⅝″ x 1-3/32″ mtg/c; Delco #7254008; Hubbell & Miller #3693.	**Holds spare crystals**	**6F505–17.**
Figs. 42 and 42.1.	**CASE: spare tube box assembly; aluminum; 5½″ lg x 1-3/16″ wd x 2″ h overall; 5 compartments; felt lined; inside hinged cover; wingnut locking; holds 5 miniature type tubes; has 4 spacers #4–40 thd on 9/16″ x 5-1/16″ mtg/c; Delco #7253923; Hubbell & Miller #3692.**	**Holds spare tubes**	
*	* * *	* *	*

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
L9, L10, L13.	COIL, RF: choke; single winding; 2 pie universal wound; unshielded; 140 turns #38SSE wire per pie; distributed capacity 0.7 mmf; ⅝" diam x ¾" lg; Delco #7253930; Rauland #LC–0177.	L9—V3 grid * * * plate r-f choke.	3C1084Z3–28.
L3, L32, L33, L34, L36, L37, L38, L39.	**COIL, RF: choke; single winding; single layer wound on phenolic form, unshielded; 50 turns #28E AWG wire; wound full length; 19/64" OD x ¾" lg; Hubbell & Miller #129.**	**L3: V1, V2 plate r-f choke.** **L32: Receiver filament supply r-f choke.** **L33: Transmitter filament supply r-f choke.** **L34: T7 r-f choke.** **L36: V10, V11 filament choke.** **L37: V9, V10 filament choke.** **L38: V6, V9 filament choke.** **L39: V12, V13 filament choke.**	**3C1084Z3–21.**
L14, L15.	**COIL, RF: choke; unshielded.**	**V4 grid r-f chokes.**	**3C1084Z3–22.**
L17, L18, L20 through L23.	**COIL ASSEMBLY, RF: single winding, single layer wound.**	**L17 and L18: V7 grid tanks.** **L20 and L21: V8 grid No. 4 (pin 6) tanks.** **L22 and L23: V8 grid No. 1 (pin 4) tanks.**	**3C1084Z3–24.**
L25, L26.	**COIL ASSEMBLY, RF: crystal oscillators; single winding, single layer wound; shielded; rectangular; aluminum can 1½" wd x ¾" thk x 3-9/16" h; adj iron cores; 2 knob adj on top; Delco #7254078; Hubbell & Miller #1214.**	**V14 grid tanks**	**3C1084Z3–23.**

*	* * *	* *	*
P1.	CONNECTOR, receptacle: 3 round male cont; straight; 29/32″ lg x 1-3/16″ sq flange; Amphenol #AN–3102–14S–7P.	Battery connector	2Z3023–5.
P3.	**CONNECTOR, receptacle: 5 round male pol cont; straight, 29/32″ lg x 1-3/16″ sq flange; Amphenol #AN–3102–14S–5P; Hubbell & Miller part #115 (part of Battery Box CY–740 ( )/PRC; Socket SO–180; for #20 AWG.**	**Battery BA–70 connector**	**2Z8799–180.**
	CONTAINER: grade X bakelite, paper base; cylindrical shape; 1¾″ lg x 7/16″ diam overall; 9/32″ lg threaded mgt bushing, 5/16″–24 thd; includes spring, lockwasher, and nut; Delco part/dwg #7253569.	**Holds test prod when not in use.**	**2Z8276–22.**
*	* * *	* *	*
J3A, B, C.	JACK ASSEMBLY, telephone: 3 jacks on metal strip; 2 for 2 cond phone plug, 1 for 3 cond microphone plug; 2-57/64″ lg x ¾″ wd x 1.240″ d over-all, strip 3/64″ thk; Delco #7254251.	J3A—MIC jack * * * J3C—PH jack.	4C4312–20.
	KNOB: round; phenolic and zinc plated steel shaft assembly; ½″ diam x 1½″ lg overall; for ⅜″ diam shaft; double #4–40 set screw for mtg; knurled cap, pointer base; Delco #7253838; Hubbell & Miller part #192.	**For SETTING NO. 7**	
*	* * *	* *	*
L30.	REACTOR: filter choke; 0.008 hy min; 0.8 amp **DC**; **0.37 ohm ±10%** DC resistance; 500 vdcw; HS metal case; 3⅝″ lg x 1½″ diam less term; Jeffsonelec #466–001–205; Rauland #LC–0174.	L30—Hum filter	3C1084Z3–26.
*	* * *	* *	*

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
R66.	RESISTOR, fixed: wire-wound; 0.31 **ohm** ±10%; **8 w at 275°C max continuous oper temp; JAN type RW30FR31.**	R66—Limits battery current during 12-volt operation.	**3RW3306.**
*	* * *	* *	*
R55, **R56.**	RESISTOR, fixed: wire-wound; 40 ohms ±5%; **8 w at 275°C max continuous oper temp;** 1" lg x 19/32" diam; JAN type #RW30F400.	R55—Drops filament voltage during 12-volt operation. **R56—Drops vibrator coil voltage during 12-volt operation.**	3RW15914.
*	* * *	* *	*
R63.	**RESISTOR, fixed: wire-wound; 710 ohms ±5%; 10 w at 275°C max continuous oper temp; JAN type RW-31F711.**	**V19 voltage regulator**	**3RW23422.**
*	* * *	* *	*
R48.	RESISTOR, variable (potentiometer): **comp;** 10,000 ohms ±10%; ¼ **w; JAN type RV–2AUSA103A.**	R48—V17 screen voltage adjustment.	**3RV41024.**
*	* * *	* *	*
	WASHER, cup: brass; nickel pl; ID 7/16" x ¼" hole diam x 5/64" h; Delco #7253421; Rauland #AG–3093.	For cover	6L50244BN.
	WASHER, flat: approx ½" OD x ⅜" ID x 0.062" thk.	**Washer**	**2Z4866.241.**
	WASHER, flat: round, ⅝" OD x ½" ID x 0.062" thk.	**Washer**	**2Z4866.243.**
	WASHER, flat: round 31/32" OD x 23/64" ID x 1/32" thk.	**Washer**	**2Z4866.240.**
*	* * *	* *	*
R31, S4.	RESISTOR, variable (potentiometer): **comp;** 1 meg ±20%; ⅛ **w; JAN type RV2BUFK105D.**	R31—VOLUME control. S4—On–off switch.	**3RV61007.**

* * *	* *	*
SEAL, water: steel body; engraved "PH" 1-7/16" lg x 15/16" wd x 7/8" d; Delco #7253664; Rauland #AG–4014.	Scale PH jack	2Z8273–6.
SHAFT ASSEMBLY	**Trimmer adjustment**	**2Z5753.46.**
SHIELD, switch: aluminum; 1-13/16" lg x 1 3/8" wd x 2" h; 2 mtg lugs on 1-3/16" mtg/c on bottom, 3/8" lg thd #6–32; Hubbell & Miller #345–21M (BC–1335–A only).	**Shields S6**	
SHIELD, tube: twist lock type mtg; 0.930" diam x 1 3/4" lg; JAN type TSFOT102.	**Shields tube**	**2Z8320–13.**
* * *	* *	*
SOCKET, tube: miniature 7 pin; molded phenolic body; 1-3/32" diam x 17/64" h over-all; JAN type SO–10–M.	Tube socket	2Z8677.94.
SOCKET, tube: 7 miniature cont; 1 piece saddle mtg; JAN type TSE7T102.	**Tube socket**	**2Z8677.99.**
SOCKET, tube: std octal cont; under chassis saddle mtg w/4 gnd lugs; JAN type TSB8T101.	**Tube socket**	**2Z8678.326.**
SPRING: flat; chart retainer; 0.016" phosphor-bronze; 1-7/16" lg x 3/8" wd x 9/64" h over-all; Delco #7253431.	Holds chart	2Z8879–56.
SPRING: flat; fastener retainer; #20 ga (0.035") spring steel, olive drab finish.	**Large fastener retainer**	**2Z7090.42.**
SPRING: loop; jack water seal retainer; 0.043" diam music wire, cad coat per table I and irridite finish per spec #72–53.	**Holds jack waterseals on J3A, B, C.**	**2Z8877.269.**

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	SPRING: flat; grounding cont; 0.011" spring brass; 1-39/64" lg x 5/8" wd x 3/8" h overall; Delco #7253814; Rauland #AG–3037.	**Makes** ground connection.	2Z8877.101.
*	* * *	* *	*
L31, C74A, B.	SUPPRESSOR, electrical noise: "A" supply; **c/o one 2 sect capacitor and r-f** choke coil on 0.050" aluminum bracket; 3-15/32" lg x 1-3/64" wd x 1 3/8" h over-all; 6 amp, 3 v DC; 3½ amp, 14 v DC; Delco #7253767; Rauland #VG–2316.	L31—Battery line noise filter. **C74A**—Battery line noise filter. **C74B**—Battery line noise filter.	3Z1891–21.3.
*	* * *	* *	*
S1A, B.	SWITCH, toggle: DPST; **JAN type #ST23K.**	S1—ALIGN 5 AND 6—ALIGN OTHERS switch.	**3Z9863–23K.**
S6A, B, C, D.	**SWITCH, SW–155: 4PDT (used in A model only).**	**BA–70—VIBR. switch**	**3Z8155.**

[AG 300.7 (3 Jul 50)]

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AAF (5); AGF (5); ASF (2); T of Opn (5); Dept (5); Def Comd (2); Base Comd (5); AAF Comd (2); Arm & Sv Bd (2); S Div ASF (1); Tech Sv (2); Sv C (5); Area A Sv C (2); WDGS Lib (5); PC&S (2); PE (2); Dep 11 (2); Gen Overseas SOS Dep (Sig Sec) (2); GH (2); M Conc C (2); Air Base Hosp (2); Gen Sv Sch (5); Sp Sv Sch (10); USMA (2); ROTC (5); Lab 11 (2); Sig AS (2); Rep Shop 11 (2); A (5); D (2); AF (2). T/O & E: 3-26 (3); 3-27 (3); 6-10-1 (3); 6-12 (3); 6-20-1 (3); 6-26 (3); 6-27 (3); 6-29 (3); 6-36 (3); 6-37 (3); 6-39 (3); 6-50-1 (3); 6-56 (3); 6-57 (3); 6-59 (3); 6-67 (3); 6-77 (3); 6-78S (3); 6-97 (3); 6-127 (3); 6-129 (3); 6-157 (3); 6-176 (3); 6-177 (3); 6-200-1 (3); 6-216 (3); 6-217 (3); 6-218 (3); 6-226 (3); 6-227 (3); 6-270-IT (3); 6-327 (3); 6-329 (3); 6-337 (3); 6-339 (3); 6-357 (3); 6-359 (3); 6-367 (3); 6-397 (3); 11-7 (3); 11-107 (3); 11-127 (3); 11-237 (3); 11-557 (3); 11-587 (3); 11-592 (3); 11-597 (3); 18-25 (3); 18-26 (3); 18-28 (3); 18-35 (3); 18-36 (3); 18-37 (3); 44-276 (3); 44-277 (3); 44-278 (3).

(For explanation of symbols see FM 21-6.)

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DESTRUCTION NOTICE

WHY —To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN—When ordered by your commander.

HOW —1. Smash—Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.

2. Cut—Use axes, handaxes, machetes.

3. Burn—Use gasoline, kerosene, oil, flame throwers, incendiary grenades.

4. Explosives—Use firearms, grenades, TNT.

5. Disposal—Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

WHAT—1. Smash—Tubes, crystals, capacitors, resistors, coils, chokes, transformers, sockets, batteries, connectors.

2. Cut—All wiring, cabling, coils, transformer windings.

3. Burn—All parts.

4. Bend—Antenna sections, cases, cabinets.

5. Bury or scatter—Any or all of the above pieces after destroying their usefulness.

DESTROY EVERYTHING

SAFETY NOTICE

When the set is turned on, do not touch the pointers on SETTING NO. 7. Touching these pointers can cause serious shock. When making service checks inside the set with the high voltage on, always have another person near-by to render aid if necessary.

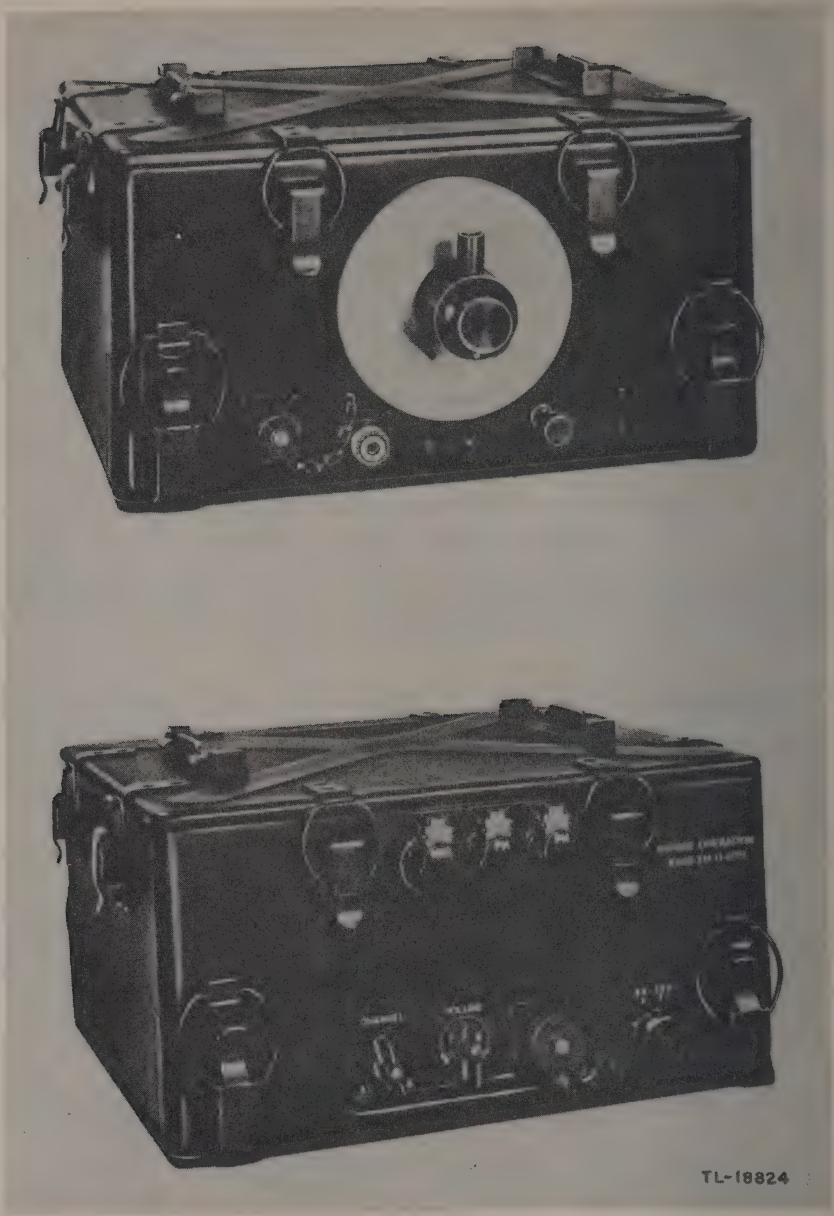


Figure 1. Receiver-Transmitter BC-1335.

PART ONE

INTRODUCTION

SECTION I. DESCRIPTION OF RECEIVER-TRANSMITTER BC-1335

1. GENERAL.

a. Description. Receiver-Transmitter BC-1335* (fig. 1) is a low-power, 18-tube, f-m (frequency-modulated) combination transmitter and receiver incorporated as a single unit. A vibrator rectifier operating from a 6- or 12-volt source is incorporated in the unit to allow operation from any 6- or 12-volt d-c (direct-current) source. An **electric eye** indicator tube is provided to preset and test the receiver-transmitter without extra metering equipment. Both transmission and reception are crystal-controlled. Receiver-Transmitter BC-1335 is designed to operate with any one of four antennas which are provided with proper connections and attachments to fit them to antenna connectors on the unit. Two phone jacks are provided to allow simultaneous use of two headsets.

b. Purpose. Receiver-Transmitter BC-1335 is a component of Radio Set SCR-619, which is adaptable, by adding accessories, for use in pack, field, or vehicular operation. This set provides two-way radiotelephone communication over distances up to 5 miles.

c. Use. In vehicular use, Receiver-Transmitter BC-1335 is connected to the vehicular battery through Battery Charger PE-219 except when the receiver-transmitter is installed in 24-volt vehicles. In the latter case the receiver-transmitter is connected to a 6-volt portable battery. The 6-volt batteries may be charged by Battery Charger PE-219 from the vehicular battery. In vehicular use the receiver-transmitter uses a 9-foot vehicular antenna. In field use the receiver-transmitter may be powered by a 6- or 12-volt battery; it uses a 12-foot antenna mounted directly to the antenna binding post. In pack use, the set may be operated from one 6-volt storage battery; it uses either the 12-foot field antenna or the 56-inch combat antenna (connected to Mast Base MP-74). An emergency antenna (Wire W-29) may also be used with Receiver-Transmitter BC-1335. This antenna consists of 27 feet of coiled wire. Strip one end of the wire and attach it directly to the antenna binding post on the receiver-transmitter; throw the free end over any near-by nonmetallic object such as a tree. Receiver-Transmitter BC-1335, with any of the above antennas, may be used wherever there is available a 6-volt d-c source that will de-

*The name plate on some models reads Radio Receiver and Transmitter BC-1335. Receiver-Transmitter BC-1335 is correct nomenclature.

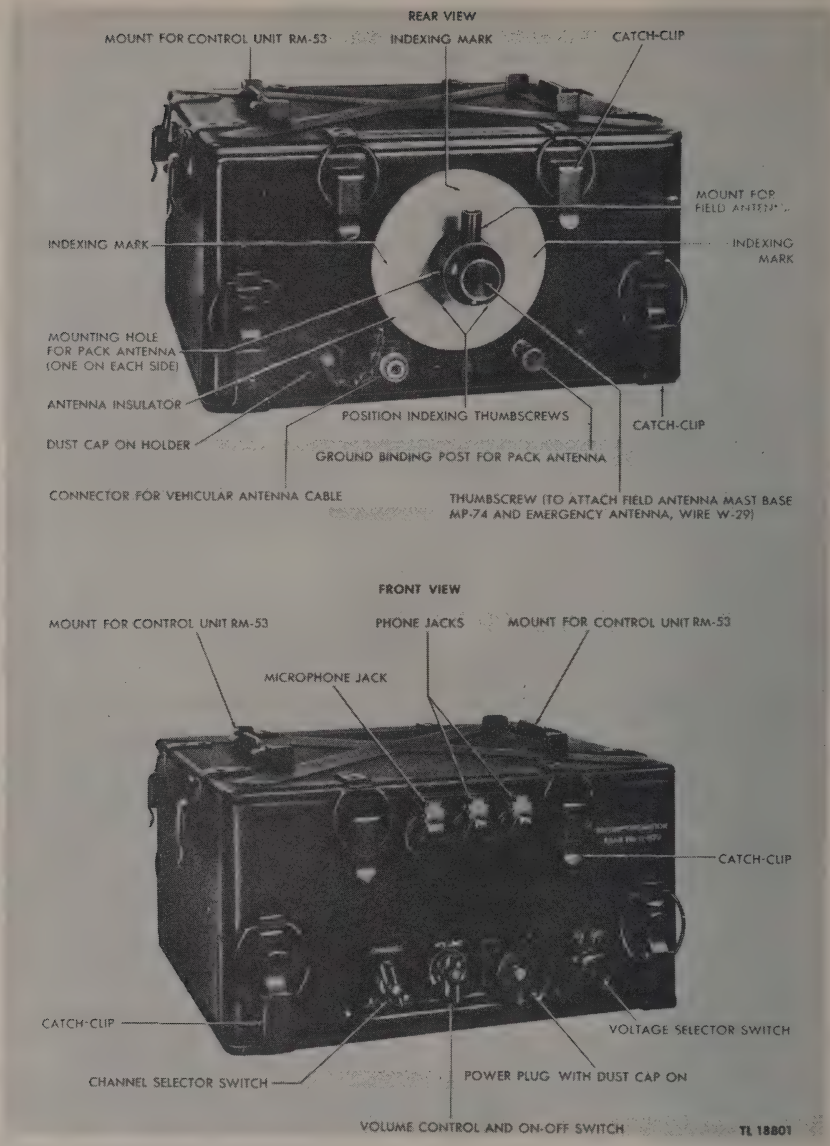


Figure 2. Receiver-Transmitter BC-1335, front and rear view.

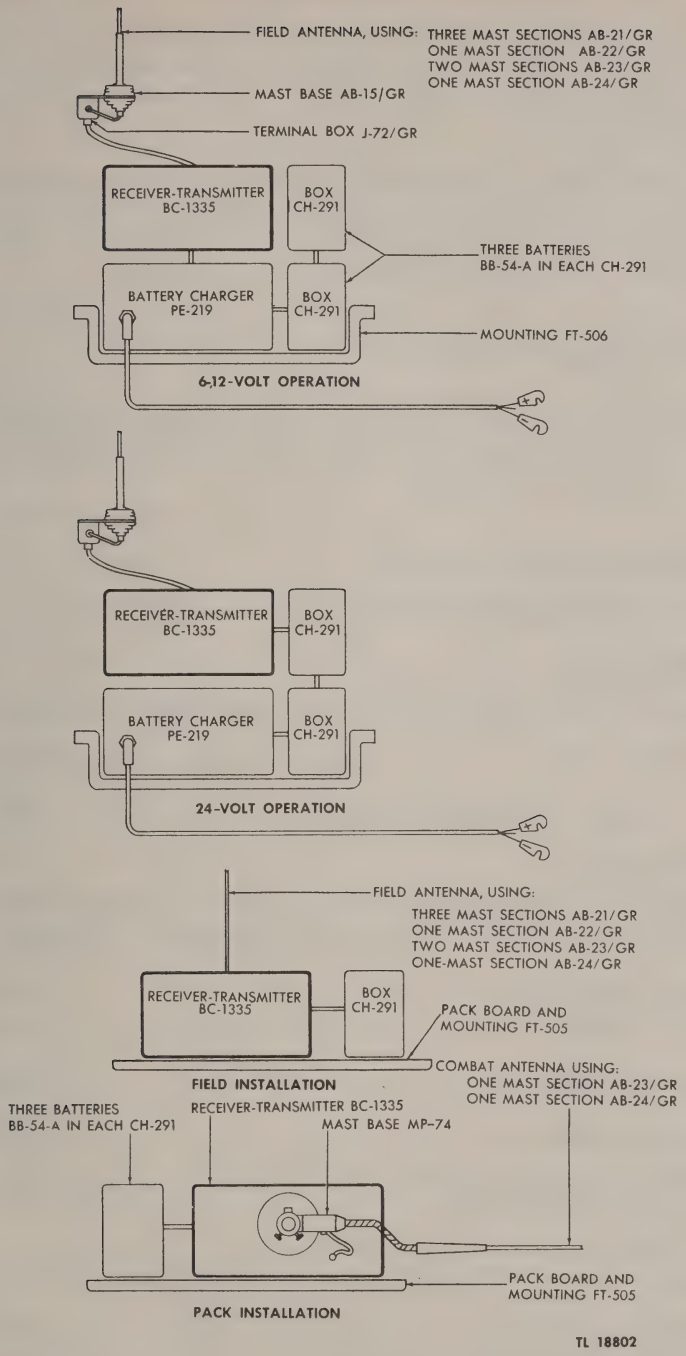


Figure 3. Receiver-Transmitter BC-1335, simplified block diagram of Radio Set SCR-619.

liver 6 amp (amperes) of current to the unit, or any 12-volt d-c source which will supply 3½ amperes. The signal may be received with any standard headset of 4,000 ohms impedance. Transmission may be accomplished by Microphone T-17, or T-45 used in conjunction with a chest set.

d. Nomenclature. Throughout this manual, official nomenclature followed by the symbol ( ) indicates all models of the item of equipment. Thus Maintenance Equipment ME-13-( ) represents Maintenance Equipments ME-13-A, -B, -C, and -D.

2. APPLICATION.

Receiver-Transmitter BC-1335 is not a complete installation in itself but is designed for use with other components, particularly those of Radio Set SCR-619.

3. TECHNICAL CHARACTERISTICS.

a. Transmitter Circuit.

Frequency range:
Two preset channels (A and B) 27.0 mc to 38.9 mc (120 channels)

Transmitter type ..... master oscillator-power amplifier

Type of signal transmitted ..... f-m voice

Distance range:
These values are approximations, since range may vary considerably according to terrain and atmospheric conditions.

Voice: Stationary ..... 5 mi
Moving ..... 5 mi

Type of modulation ..... frequency

Number of tubes 18

NOTE: The receiver crystal controls frequency of transmission through the reactance tube.

Power input:
6-volt ..... 6 amp
12-volt ..... 3½ amp

Power output:
Voice operation ..... 1.5 w

Antennas:

Pack	56 in. long, impedance-matched to transmitter with Mast Base MP-74
Vehicular	9 ft long, impedance-matched to transmitter with Terminal Box J-72 /GR, and Cord CG-67/MRQ-2 9 ft long, with Amphenol connector
Field	12 ft long, requiring no external impedance matching
Emergency	Wire W-29, 27 ft long, requiring no external impedance matching

Power supply ..... 6- or 12-v storage battery

Weight, complete unit ..... 24 lb

b. Receiver Circuit.

Frequency range:

Two preset channels ..... 27.0 mc to 38.9 mc (120 channels)

Receiver type ..... superheterodyne

Type of signal which can be received ..... f-m voice

Number of tubes:

Receiver chassis 11

Intermediate frequency ..... 4,300 kc

Method of tuning ..... 2 channels preset to crystal

Power input:

6-volt ..... 3.5 amp

12-volt ..... 2.5 amp

Power supply ..... 6- or 12-v storage battery

Antenna ..... same as transmitter

Weight, complete unit ..... 24 lb

4. COMMUNICATION WITH OTHER RADIO SETS.

Receiver-Transmitter BC-1335 has a frequency coverage of 27.0 to 38.9 mc (megacycles) which is exactly the same as Radio Sets SCR-608, SCR-609, SCR-610, SCR-808, and SCR-828. Therefore these sets can be used for intercommunication (fig. 4).

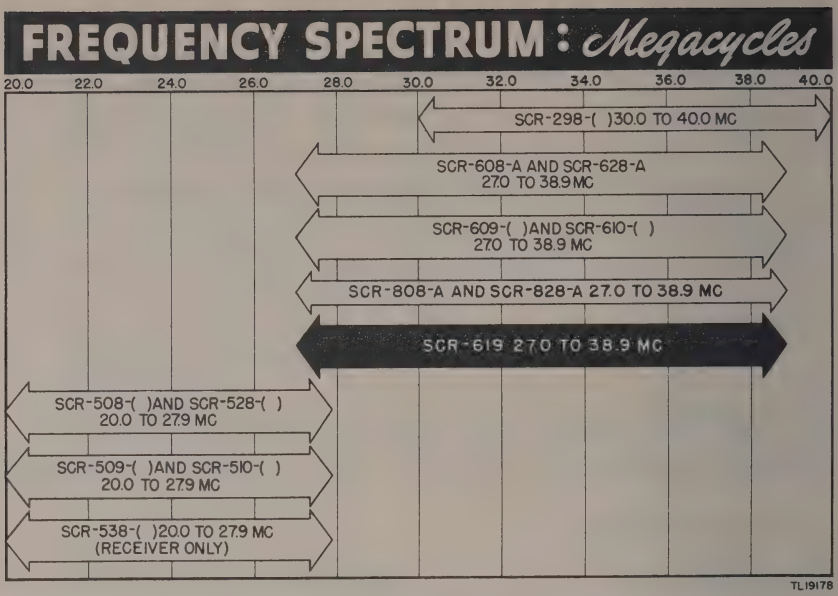


Figure 4. Radio Set SCR-619, frequency spectrum chart.

5. TABLE OF COMPONENTS.

Component	Quantity
Battery BA-45	4
Fuse FU-21	4
Crystal set (120, each in a Crystal Holder FT-243)	1
Dial lamp	3
Tube JAN-OB3/VR-90	2
Tube JAN-1L4	2
Tube JAN-1R5	13
Tube JAN-3A5	4
Tube JAN-3Q4	10
Tube JAN-6AF6G	2
Ballast tube	2
Vibrator	2
TM 11-879	2

NOTE: This list is for general information. See appropriate publication for information pertaining to requisition of spare parts.

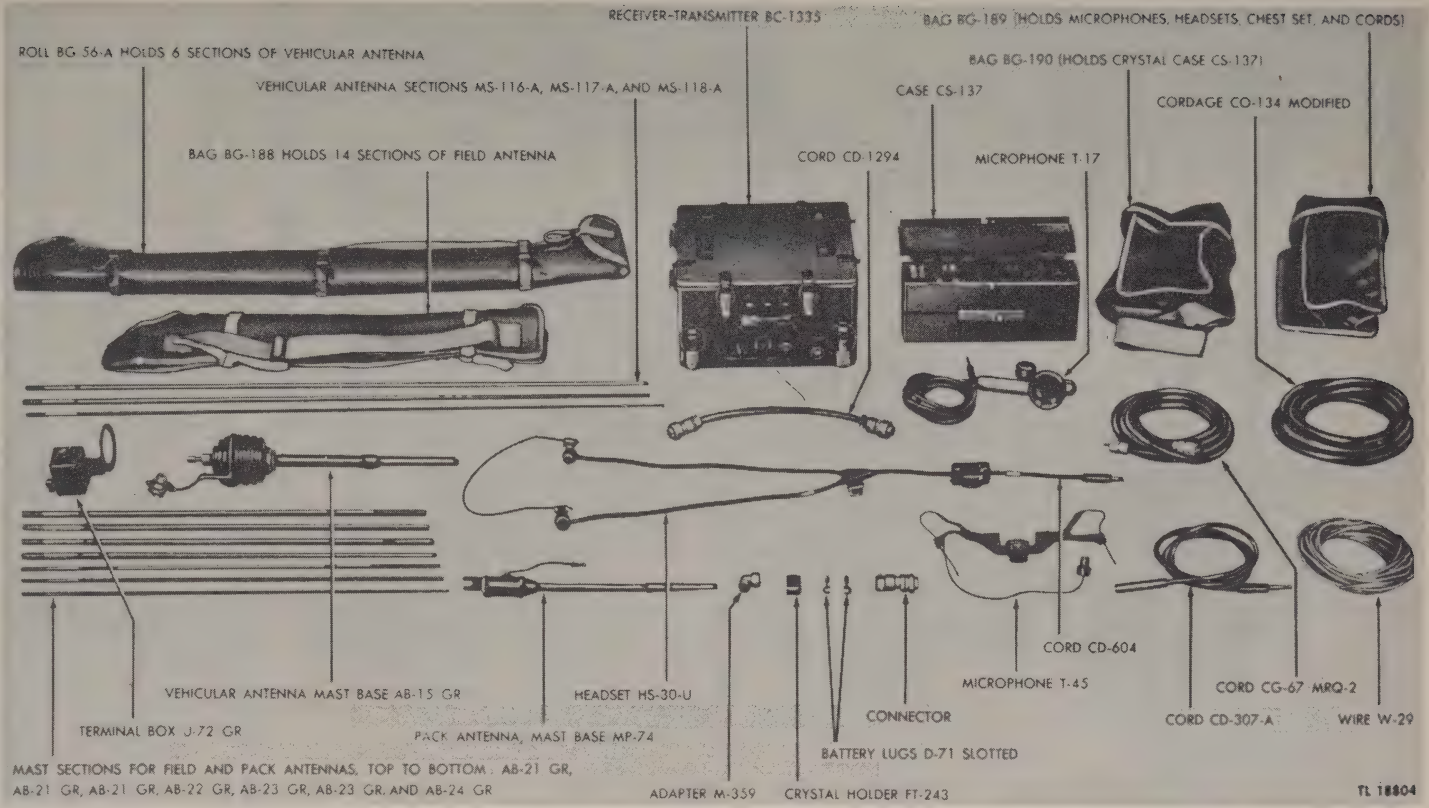


Figure 5. Receiver-Transmitter BC-1335, accessories.

6. SHIPPING WEIGHTS AND DIMENSIONS OF PACKED SETS.

Receiver-Transmitter BC-1335 is packed as a unit in a corrugated paper carton 13½ inches wide by 16 inches deep by 12½ inches high (fig. 8) with a total weight of approximately 38 pounds. The unit package is a double carton with a vaporproof barrier, or lining, around the inside carton. For export, the set is packed in a wooden crate holding 10 separate cartons which contain the following additional components of Radio Set SCR-619.

Quantity	*Description*
	20 Mast Sections
6	AB-21/GR
2	AB-22/GR
4	AB-23/GR
2	AB-24/GR
2	MS-116-A
2	MS-117-A
2	MS-118-A
1	Mast Base AB-15/GR
1	Set (120) crystals (118 packed individually, 2 in receiver-transmitter)
1	Bag BG-188
1	Bag BG-189
1	Bag BG-190
1	Cover BG-192
1	Roll BG-56-A
1	Case CS-137
1	Cord CD-1294
1	Mast Base MP-74
2	Adapter M-359
1	Wire W-29
2	TM 11-619
2	TM 11-879
	Set of twelve Tubes
4	JAN-1L4
1	JAN-1R5
4	JAN-3A5
1	JAN-3Q4
1	JAN-6AF6G
1	JAN-OB3/VR90

For further details on packaging Receiver-Transmitter BC-1335 with tubes and crystals, and in wooden crate with major components, refer to TM 11-619, Radio Set SCR-619.

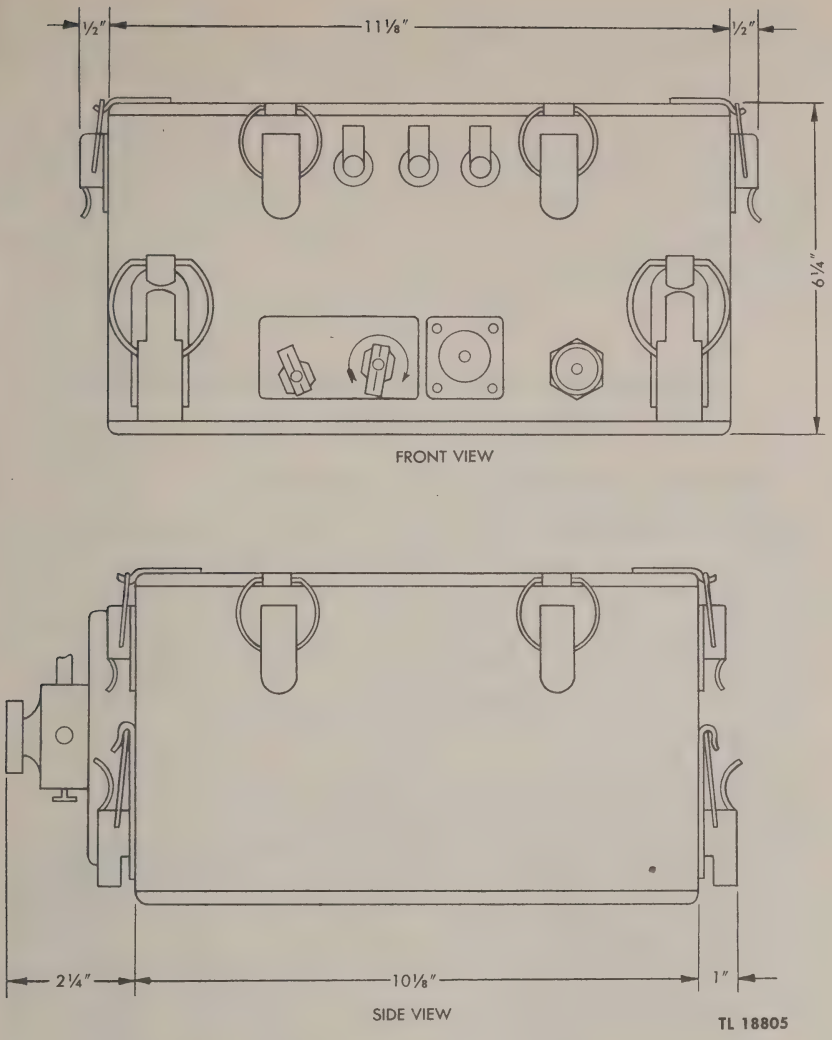


Figure 6. Receiver-Transmitter BC-1335, dimensions.

7. DECRIPTION OF COMPONENTS.

a. General. For information on accessories, refer to appropriate sections in TM 11-619.

b. Receiver-Transmitter BC-1335. The receiver-transmitter is contained in an aluminum cabinet, 12⅛ inches long, 13⅜ inches deep, and 6¼ inches high (fig. 6). The top of the cabinet, which is fastened with 8 catch-clips, is provided with a mount for Control Unit RM-53 (part of Remote Control Equipment RC-261). The bottom

of the cabinet is fastened with 12 screws. At each bottom corner of the cabinet is a catch-clip for mounting the receiver-transmitter on Mounting FT-505 or Mounting FT-506.

c. Crystal Holder FT-243. Each of the 120 crystals supplied with the receiver-transmitter is mounted in a Crystal Holder FT-243. This holder is a small waterproof plastic container equipped with pins which plug into either of two channel sockets on the chassis of the receiver-transmitter.

SECTION II. INSTALLATION OF RECEIVER-TRANSMITTER BC-1335

8. UNPACKING, UNCRATING, AND CHECKING.

Receiver-Transmitter BC-1335 is packaged in a carton that is contained in a larger carton holding the receiver-transmitter, a set of crystals, and a set of spare tubes (figs. 7 and 8). Unpack the receiver-transmitter carefully and inspect for possible damage during shipment. The receiver-transmitter is shipped with all tubes and crystals installed. To unpack, proceed as follows:

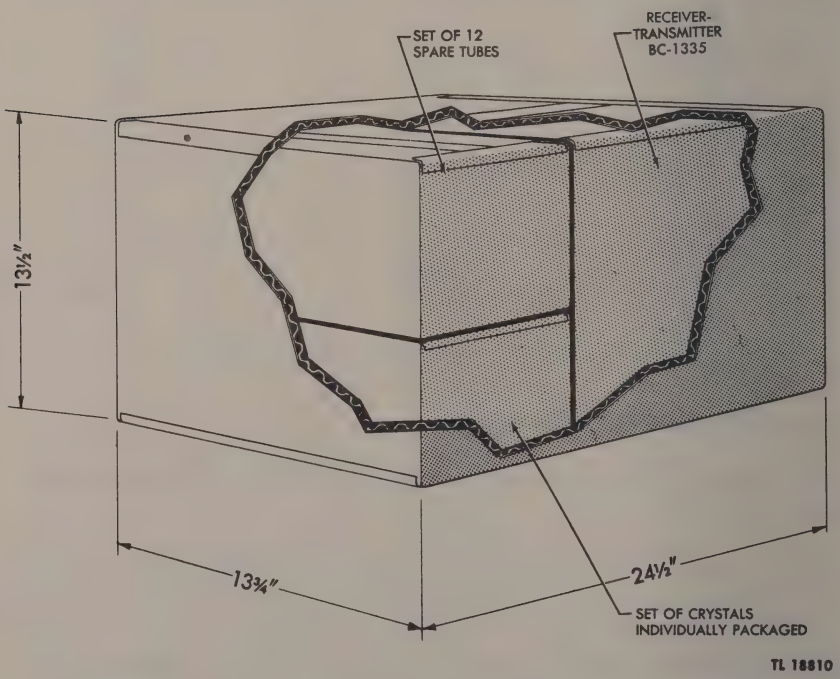


Figure 7. Receiver-Transmitter BC-1335, packaging.

a. Open outside carton with knife or other sharp instrument.

b. Open vaporproof barrier.

c. Open inside carton.

d. Remove four bags of silica gel on top of protection pad.

e. Remove protection pad.

f. Remove four corner pads that hold unit in place in carton, and remove plywood panels at front and rear that protect control panel and antenna post.

g. Take unit out of inside carton.

h. Remove top cover by unfastening eight catch-clips.

i. Take out bags of silica gel on top of chassis.

j. Replace top cover. The receiver-transmitter is now ready for installation as a unit of Radio Set SCR-619.

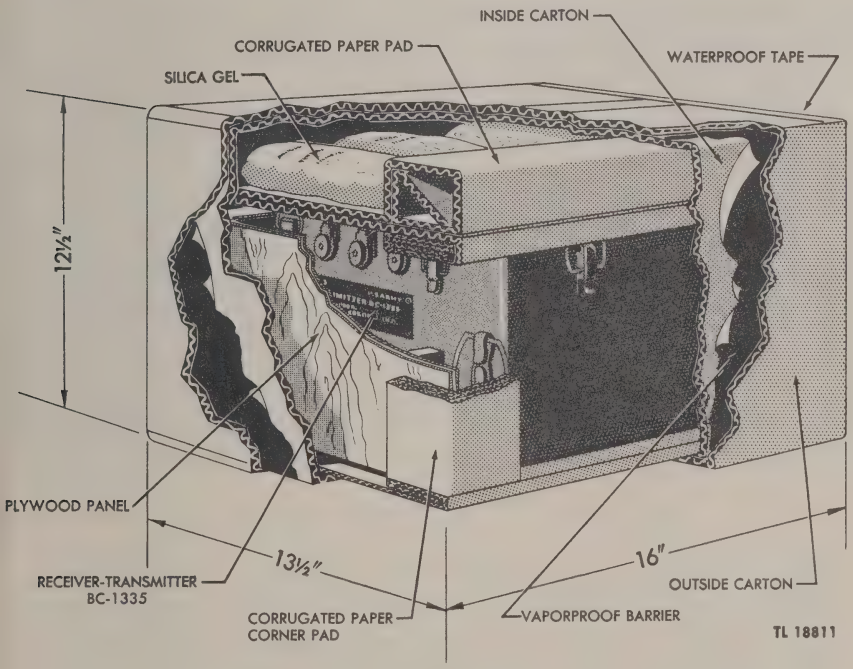


Figure 8. Receiver-Transmitter BC-1335, cutaway showing packaging.

9. CONNECTIONS AND INTERCONNECTIONS.

a. To connect the receiver-transmitter to Battery Charger PE-219, refer to TM 11-982.

b. For instructions on connecting the receiver-transmitter to the accessories, refer to TM 11-619.

c. Antenna connections are discussed in paragraph 11 of TM 11-619.

d. For instructions on connecting the receiver-transmitter to Remote Control Equipment RC-261, refer to TM 11-2632.

10. INSTALLATION.

Receiver-Transmitter BC-1335 is shipped with tubes and all essential parts installed. No installation of parts is necessary for proper operation except for antenna systems, which are discussed in TM 11-619. If Receiver-Transmitter BC-1335 is to be used as a pack unit, install it on a packboard with Mounting FT-505. It is held in place with catch-clips provided for that purpose. When used in a vehicular installation, the receiver-transmitter is mounted either on Mounting FT-506 or on top of Battery Charger PE-219. For field operation, mount the receiver-transmitter on the packboard with the adapter.

NOTE: For more detailed instructions on installing and mounting Receiver-Transmitter BC-1335 as a component of Radio Set SCR-619, refer to TM 11-619.

11. REPACKING.

To repack Receiver-Transmitter BC-1335, reverse the operations outlined in paragraph 8 as far as available materials will allow.

PART TWO

OPERATING INSTRUCTIONS

NOTE: For information on destroying the equipment to prevent enemy use, refer to the destruction notice at the front of the manual.

SECTION III. CONTROLS AND THEIR USE

12. CONTROLS AND THEIR USE.

a. General. Receiver-Transmitter BC-1335 is provided with three controls (fig. 9) which make it possible to turn it on and off, to vary receiver volume, to receive or transmit on either of two channels (A or B), and to select either 6- or 12-volt operation according to the available power source. Normally the receiver-transmitter is on receiving.

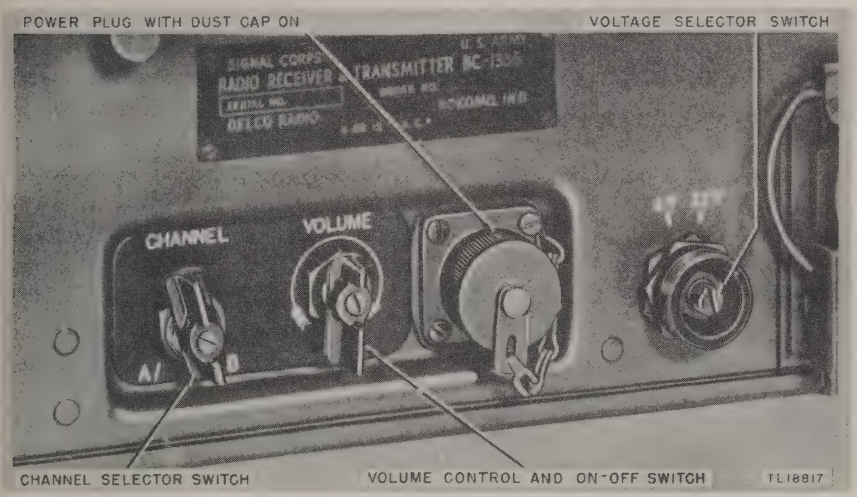


Figure 9. Receiver-Transmitter BC-1335, control panel.

(1) *VOLUME Control.* The VOLUME control is also the on-off switch for the receiver-transmitter. When the control is at the extreme left, the receiver-transmitter is turned off. Rotating the VOLUME control in a clockwise direction turns the set on. Turning the switch farther clockwise in the direction of the arrow increases the volume of the signal received. The VOLUME control does **not** control transmission volume. When this control is turned counterclockwise, a slight click will be heard when the pointer is about 20° from the starting position, indicating the receiver-transmitter is turned off.

(2) *CHANNEL Selector Switch.* The CHANNEL selector switch on the control panel allows transmission and reception on either channel A or B. (These channels may be any two of 120 channels determined by selection of crystals and presetting. See sec. XV.) Do not set the CHANNEL switch between stops. It must be at either A or B setting, depending on the channel assigned. Receiver-Transmitter BC-1335 is designed to get through maximum interference and enemy jamming. If interference is too heavy on one channel, the alternate channel may be used simply by turning the CHANNEL switch. It is not necessary to turn the set off to change channels.

(3) *Voltage Selector Switch.* The voltage selector switch is a screwdriver adjustment on the control panel, labeled 6 V-12 V. It provides a means of changing the internal connections of the receiver-transmitter for either 6- or 12-volt operation.

b. Microphone. The press-to-talk switch on Microphone T-17 (fig. 10) controls transmitter circuits by applying voltage to the transmitter filaments. When the switch is in the normal position, the receiver circuit is in operation. Depressing the press-to-talk switch automatically turns on the transmitter. With the press-to-talk switch depressed, transmission is possible immediately by speaking with a normal voice into the microphone. The press-to-talk switch must be held down throughout voice transmission. When pressure is released, the switch automatically goes back to the receive position.

NOTE: Be sure press-to-talk switch is released to receive signals; there is a tendency to keep this switch depressed, and no signals can be received during such time. Remember that the VOLUME control affects only signals received; it does not affect volume on transmission.

Figure 10. Microphone T-17, press-to-talk switch.

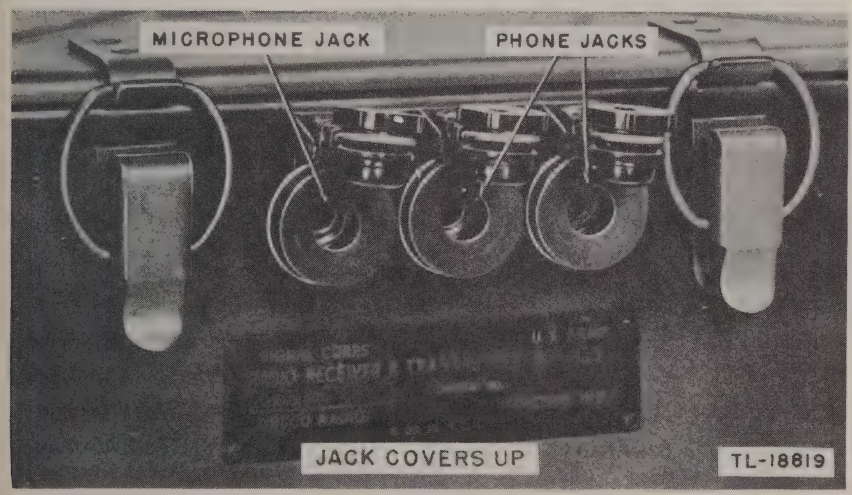


Figure 11. Microphone and headset jacks on control panel.

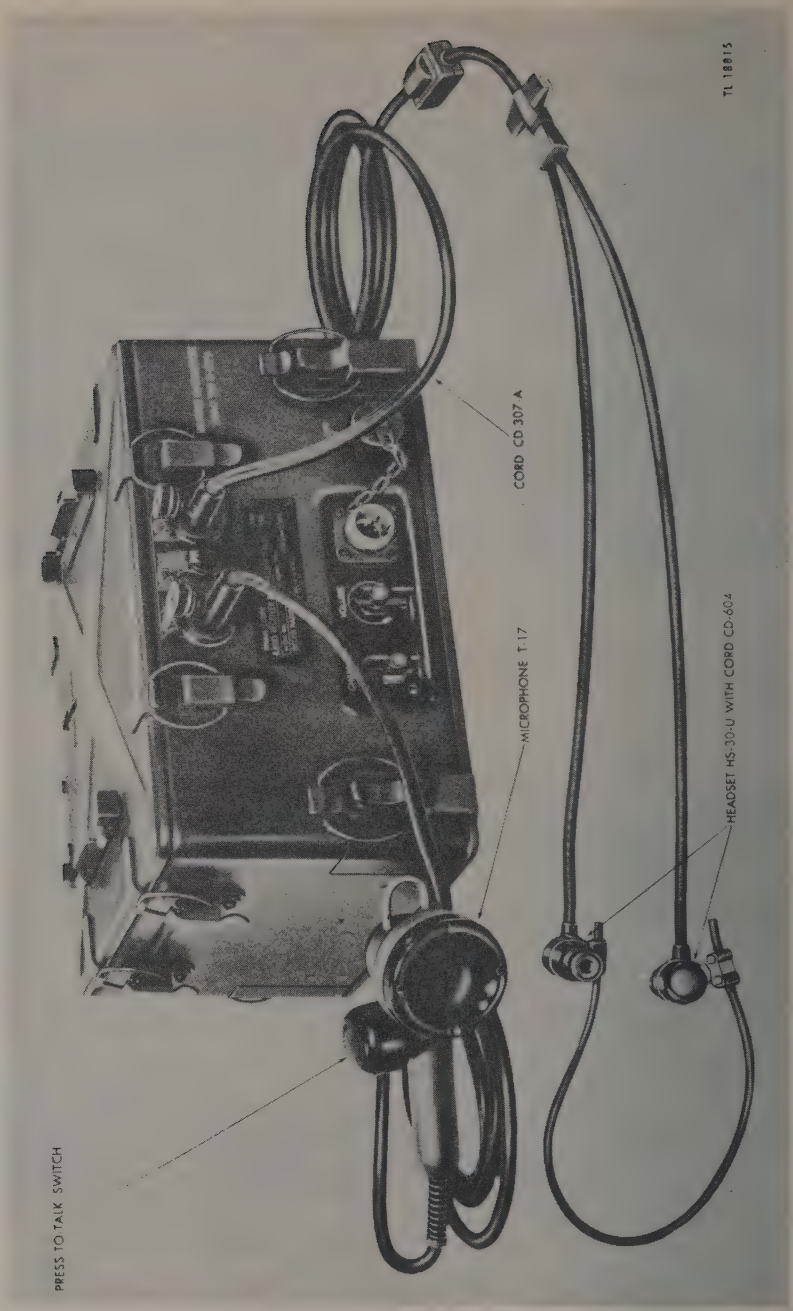


Figure 12. Receiver-Transmitter BC-1335, microphone and headset plugged in.

c. Remote Control Equipment RC-261. This equipment can be used in connection with Receiver-Transmitter BC-1335, and permits complete control of the receiver-transmitter up to a distance of 2 miles. Refer to TM 11-2632 for further details.

SECTION IV. OPERATION

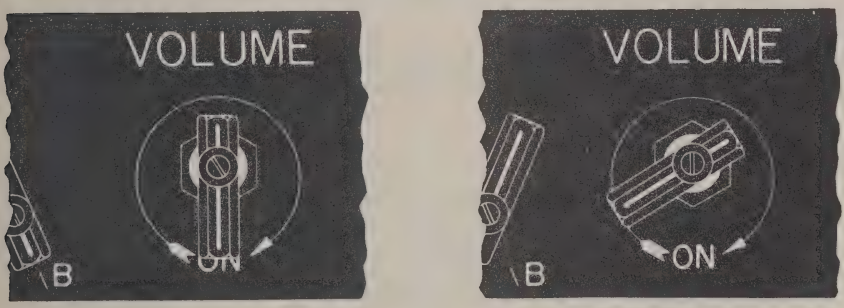
13. STARTING PROCEDURE.

After Receiver-Transmitter BC-1335 has been properly sited and installed (TM 11-619) with antenna and storage battery, it is ready to operate.

a. Plug microphone and headset into jacks on front panel (fig. 11).

NOTE: To keep moisture out, close the jack water seals when the set is not in use (fig. 11).

b. Turn VOLUME control in direction of arrow. A slight click will be heard after the control has been turned approximately 20°, indicating that the set is on.



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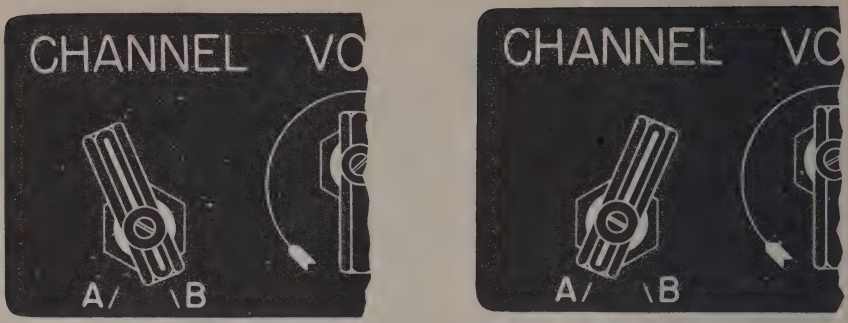
14. PRECISE OPERATING INSTRUCTIONS.

CAUTION: Keep transmissions short. The enemy can plot the position of the radio set with a direction finder.

a. Turn CHANNEL switch to the channel on which communication is to be established.

b. Rotate VOLUME control full clockwise and listen for a loud hiss in the headphones. The hiss should stop when a signal is being received.



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c. Check transmission by depressing the microphone press-to-talk switch and speaking into the microphone. If the set is in proper condition to transmit a signal, the operator will hear his own voice through the earphones.

d. Regulate volume to the desired level after the station has been contacted.

e. To transmit, depress the microphone press-to-talk switch and speak clearly into the mouthpiece. Depressing this switch automatically changes the circuit within the set for transmission. Releasing the switch automatically resets receiver-transmitter circuits for reception.

NOTE: The VOLUME knob controls only the receiver volume, and has no effect on the power of the transmitter.

15. STOPPING PROCEDURE.

To stop Receiver-Transmitter BC-1335 turn the VOLUME control to the left as far as it will go. A click will indicate that the set is turned off. The set is ready for immediate use on the same or alternate channel by turning the VOLUME control clockwise.

SECTION V. EQUIPMENT PERFORMANCE CHECK LIST

16. PURPOSE AND USE OF CHECK LIST.

a. General. The equipment performance check list (par. 17) will help the operator determine whether Receiver-Transmitter BC-1335 is functioning properly. The check list gives the item to be checked, the conditions under which the item is checked, the normal indications and tolerances of correct operation, and the

corrective measures the operator can take. Check items 1 to 4 before starting (before turning the equipment on), items 5 and 6 when starting, item 7 during operation, and item 8 when stopping (when turning the equipment off).

b. Action or Condition. For some items, the information given in the action or condition column consists of the settings of various switches and controls under which the item is to be checked. For other items it represents an action that must be taken to check the normal indication given in the normal indication column.

c. Normal Indications. The normal indications listed include the visible and audible signs that the operator will perceive when he checks the items. If the indications are not normal, the operator should apply the recommended corrective measures.

d. Corrective Measures. The corrective measures listed are those the operator can make without turning the equipment in for repairs. When reference is made in the table to part five it indicates that the trouble cannot be corrected during operation and that trouble shooting by an experienced repairman is called for. If the set is completely inoperative or if the recommended corrective measures do not yield results, trouble shooting is necessary. However, if the tactical situation requires that communication be maintained and if the set is not completely inoperative, the operator must maintain the set in operation as long as it is possible to do so.

e. Items 1 to 4. Items 1 to 4 should be checked each time the equipment is put into operation.

f. Items 5 to 7. These items represent general operating characteristics of the transmitter. The operator must become familiar with the characteristics of the set during normal operation; he must use that knowledge as a basis for recognizing changes in audible and visible indications, such as the hiss in the headset and sidetone when the set is not operating properly. The operator should familiarize himself with the operation of Receiver-Transmitter BC-1335 so that he knows the characteristics of its reception of normal signals. By becoming familiar with the operation of the set, the operator will know the normal position of the VOLUME control. This will aid in an approximate determination of the sensitivity and amplification of the receiver.

g. Item 8. Item 8 is checked whenever the station is taken out of operation.

17. EQUIPMENT PERFORMANCE CHECK LIST.

	Item No.	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	1	Headset and microphone.	Plug into respective jacks.		
	2	CHANNEL switch.*	Set to proper channel.		
	3	6 V-12 V switch.	Set to proper voltage.		
	4	RADIO charger connector or portable battery.	Connect to desired power source.		
START	5	VOLUME control.	Turn full on in clockwise direction.	Loud rushing noise heard in headset.	Check power connections. Check fuse. Check that alignment switch is in ALIGN OTHERS position.

*Switch to other channel and repeat items 5 through 7.

17. EQUIPMENT PERFORMANCE CHECK LIST (contd).

	Item No.	Item	Action or condition	Normal indications	Corrective measures
EQUIPMENT PERFORMANCE	6	Press-to-talk switch.	Press.	Noise stops.	Check presetting. Check SETTING NO. 5
	7	Sidetone.	Talk into microphone.	Sidetone in headset.	Check microphone cord and plug. Check SETTING NO. 5 (par. 101). Check that tube V-5 is not defective; if so, replace.
STOP	8	VOLUME control.	Turn fully counterclockwise.	Noise in headset stops; click is heard.	

MAINTENANCE INSTRUCTIONS

SECTION VI. PREVENTIVE MAINTENANCE TECHNIQUES

18. MEANING OF PREVENTIVE MAINTENANCE.

Preventive maintenance is a systematic series of operations performed at regular intervals on equipment, when turned off, to eliminate major break-downs, unwanted interruptions in service, and to keep equipment operating at top efficiency. To understand what is meant by preventive maintenance, it is necessary to distinguish between preventive maintenance, trouble shooting, and repair. The prime function of preventive maintenance is to **prevent break-downs** and, therefore, the need for repair. On the other hand, the prime function of trouble shooting and repair is to locate and correct **existing** defects. The importance of preventive maintenance cannot be overemphasized. A system of radio communication depends on the performance of every set. It must be ready to go **on the air when it is needed,** and it **must operate efficiently.** Therefore, it is vitally important that radio operators and repairmen maintain their radio sets properly. See TB SIG 123, Preventive Maintenance Practices for Ground Signal Equipment.

NOTE: The operations in sections VI and VII are first and second echelon (organization operators and repairmen) maintenance. Some operations in section X are higher echelon maintenance.

19. DESCRIPTION OF PREVENTIVE MAINTENANCE TECHNIQUES.

a. General. Most of the electrical parts used in Receiver-Transmitter BC-1335 require routine preventive maintenance. This preventive maintenance varies. Some parts require a different kind of maintenance than others. Some require more, some less. Definite and specific instructions must be followed. Hit-or-miss techniques cannot be applied. This section of the manual contains these specific instructions to guide personnel assigned to perform the six basic maintenance operations: Feel, Inspect, Tighten, Clean, Adjust, and Lubricate. Throughout this manual the lettering system for the six operations will be as follows:

F—Feel*	C—Clean
I—Inspect	A—Adjust*
T—Tighten	L—Lubricate*

*The Feel, Adjust, and Lubricate operations are inapplicable to Receiver-Transmitter BC-1335.

The first two operations show if the other four are needed. Selection of operations is based on a knowledge of field needs. For example, dust encountered on dirt roads during cross-country travel filters into equipment no matter how much care is taken to prevent it. Rapid changes in weather (such as heavy rain followed by blistering heat), excessive dampness, snow, and ice tend to cause corrosion of exposed surfaces and parts. Without frequent inspections and the necessary tightening, cleaning, and lubricating operations, equipment becomes undependable and subject to break-down when it is needed most.

b. Feel. The feel operation is used most often to check rotating machinery, such as dynamotors, blower motors, and drive motors, also to determine whether electrical connections and bushings are overheated. Feeling will show the need for lubrication or the existence of other defects requiring correction. The maintenance man **must** become familiar with the normal operating temperatures of motors, transformers, and other parts, to recognize signs of overheating.

NOTE: Perform the feel operation as soon as possible after shut-down and always before any other maintenance is done.

c. Inspect. Inspection is the most important operation in preventive maintenance. A careless observer will overlook evidences of minor trouble. Although these defects may not at the moment interfere with performance of the equipment, invaluable time and effort can be saved if they are corrected **before** they lead to major and costly break-downs. To be able to recognize the signs of a defective set, make every effort to become thoroughly familiar with indications of **normal** functioning. Inspection consists of **carefully** observing all parts of the equipment, noticing their color, placement, state of cleanliness, etc. Inspect for the following conditions:

(1) Overheating, as indicated by discoloration, blistering, or bulging of the parts or surface of the container; leakage of insulating compounds; and oxidation of metal contact surfaces.

(2) Placement, by observing that all loads and cabling are in their original positions.

(3) Cleanliness, by carefully examining all recesses in the units for accumulation of dust, especially between connecting terminals and binding posts. Parts, connections, and joints should be free of dust, corrosion, and other foreign matter. In tropical and high-humidity areas, look for fungus growth and mildew.

(4) Tightness, by testing any connection or mounting which appears to be loose.

d. Tighten, Clean, and Adjust. These operations explain themselves. Specific procedures to be followed in performing them are given wherever necessary throughout part three.

CAUTION: Do not tighten screws, bolts, and nuts carelessly. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

Whenever a loose connection is tightened, moistureproof and fungiproof it again by applying the varnish with a small brush. See section X for details of moistureproofing and fungiproofing.

c. Lubricate. Lubrication refers to the application of grease or oil to the bearings of motors or rotating shafts. It may also mean the application of a light oil to door hinges or other sliding surfaces on the equipment.

20. VACUUM TUBES.

NOTE: Avoid working on the tubes immediately after shut-down. Severe burns may result from contact with the envelopes of hot tubes.

a. Inspect (I).

(1) Inspect glass tube envelopes for accumulation of dirt. Replace tubes with loose envelopes if possible.

(2) Inspect the firmness of tubes in their sockets by pressing the tubes down in the sockets and testing them in that position (not by partially withdrawing the tubes and jiggling them from side to side). Movement of a tube tends to weaken the pins in the base and unnecessarily spread the contacts in the socket. Inspect the sockets of the tubes at the time the tubes are removed.

(3) When it is necessary to remove a tube from its socket, be careful. Never jar a warm tube.

b. Tighten (T). Tighten all loose connections to the tube sockets or to the tubes. If the connections are dirty or corroded, clean before tightening. When tightening locknuts that hold the sockets to the insulated bushings, do not apply excessive pressure. Too much pressure will crack the bushings.

c. Clean (C).

(1) Clean the tubes only if inspection shows cleaning to be necessary. Tubes operating at low voltages and not having exposed grid and plate caps do not require frequent cleaning. However, do not permit dirt to accumulate on low-voltage tubes.

(2) Remove dust and dirt from the glass envelopes with a clean, lint-free, dry cloth.

(3) When tube sockets are cleaned and the contacts are accessible, use fine sandpaper to remove corrosion, oxidation, and dirt.

21. CAPACITORS.

a. Inspect (I).

(1) Inspect the terminals of large fixed capacitors for corrosion and loose connections. Carefully inspect the mountings to discover loose mounting screws, studs, or brackets. Examine the leads for poor insulation, cracks, and evidences of dry rot. Cut away frayed strands on the insulation. If the wire is exposed, wrap it with friction tape. The terminals of the capacitors should not be cracked or broken.

(2) Thoroughly inspect the case of each large fixed capacitor for leaks, bulges, and discoloration.

(3) Inspect the plates of variable capacitors for dirt, dust, or lint. Examine the movable set of plates for signs of damage or misalignment that would cause them to touch the fixed plates during tuning. Rotate the movable plates, using the tuning control, and thus check for proper operation of the capacitor.

b. Tighten (T). Tighten loose terminals, mountings, and connections on the capacitors. Do not break the bushing or damage the gasket.

c. Clean (C).

(1) Clean the case of fixed capacitors, the insulating bushings, and dirty or corroded connections. The capacitor cases and bushings can usually be cleaned with a dry cloth, but if the deposit of dirt is hard to remove, moisten the cloth in Solvent, Dry-cleaning (SD).

(2) Clean the plates of variable capacitors with a small brush, removing all dust and lint.

d. Lubricate (L). The bearings of variable capacitors are usually of the ball-bearing type, lubricated and sealed at the factory. These bearings will **not** need relubrication during the life of the equipment.

22. RESISTORS.

a. General. Various types of resistors are used in Receiver-Transmitter BC-1335. The connections to the various resistors are either pigtail or solder lug.

b. Inspect (I). Inspect the coating of the vitreous-enameled resistors for signs of cracks and chipping, especially at the ends. Examine the bodies of all types of resistors for blistering, discoloration, and other indications of overheatng. Inspect leads and all other connections for corrosion, dirt, dust, looseness, and broken strands in the connecting wires. Check the security of all mountings. Do not attempt to move resistors with pigtail connections, because there is danger of breaking the connections at the point where they enter the body of the resistor. Such defects cannot be repaired.

c. Tighten (T). Tighten loose resistor connections and mountings. If a resistor is allowed to remain loose, vibration may break the connection or damage the body.

d. Clean (C).

(1) Clean all carbon resistors with a small brush.

(2) The vitreous-enameled resistors must be kept clean to avoid leakage between the terminals. Wipe them with a dry cloth. However, if the dirt deposit is unusually hard to remove, use dry-cleaning solvent (SD).

(3) Resistors with discolored bodies cannot be cleaned. Discoloration indicates that there has been overloading and overheating at some time prior to the inspection. The discoloration is probably due to circuit trouble which requires analysis and correction. Trouble-shooting procedures are described in part five.

23. FUSES.

a. General. Fuse (F-1) used in Receiver-Transmitter BC-1335 has a glass case. The glass case fuse is easily removed for inspection. See that the fuse ends and holding clips are kept clean and tight. If they are not, arcing and burning will occur and make the replacement of the complete holder necessary. Throw away fuses when they blow.

b. Inspect (I). Inspect the fuse caps for evidence of burning, charring, and corrosion; the fuse clips for dirt, loose connections, and proper tension.

c. Clean (C). Clean fuse ends and fuse clips with emery cloth; then wipe them with a clean cloth. When using a file to remove deep pits on the clips, fuse ends, or contacts, always finish up with emery cloth to leave a smooth contact surface. As a final step, wipe the surface with a clean dry cloth.

24. BUSHINGS AND INSULATORS.

a. Description.

(1) Insulated bushings are used in the high-voltage and r-f (radio-frequency) circuits. They are constructed of ceramic material with a glazed surface. An insulator is no better than its surface, so deposits of foreign substances on the surface will materially reduce the insulation value of the bushing. Therefore, it is very important that all bushings used in the high-voltage circuits be inspected frequently.

(2) Insulated bushings are used as supports for high-voltage tube sockets, for high-voltage terminals of capacitors, and for tank coils. They are used as mountings for resistors in high-voltage circuits and as supports for panels which mount other parts. The condition of insulator bushings that are used solely as panel supports is not critical, but the condition of bushings used as high-voltage insulators is extremely important.

b. Inspect (I). Inspect the physical condition of the insulator bushings. They should be clean without cracks or chips. It is possible for a highly glazed insulator to develop fine-line surface cracks where moisture and dust will accumulate and eventually form a leakage for a high-voltage flash-over. Inspect the surface of the bushings to detect such cracks. As a rule, the bushings are held in position with nuts screwed onto the threaded conductors. These can be replaced very easily. If replacement is not possible because of a shortage of supplies, frequently clean the defective bushing thoroughly with dry-cleaning solvent (SD). Sometimes it is difficult to see dust on a glazed surface. A satisfactory check can be made by sliding a clean finger across the bushing.

c. Tighten (T). The procedure to be used in tightening loose bushings is self-evident. However, one precaution must be observed. **Avoid forcing the nuts or screws down too tight.** If excessive pressure is exerted on the bushings, damage or breakage is almost certain. If the threads on bushing stud bolts are stripped so that they cannot be tightened, replace the entire bushing.

d. Clean (C). Insulating bushings are easily cleaned. Never use abrasive materials because the glazed finish will be destroyed thus permitting moisture to be absorbed. A clean cloth is usually satisfactory. If deposits of grime or dirt on the surface of a bushing are hard to remove, use dry-cleaning solvent (SD). After the surface has been cleaned with a solvent, carefully polish it with a dry cloth. Otherwise, a thin film of the solvent will be left which may impair the effectiveness of the bushing as a high-voltage insulator.

25. SWITCHES.

a. Inspect (I).

(1) Inspect the mechanical action of each switch and, while so doing, look for signs of dirt or corrosion on all exposed elements. In some cases, it will be necessary to examine the elements of the switch visually; in others, check the action of the switch by flipping the control knob or toggle, or press the switch button and note the freedom of movement and amount of spring tension.

(2) Examine ganged switch S-2 and S-5 to see if they are properly lubricated and if the contacts are clean. Inspection is visual. Do not pry the leaves of the switch apart. The moving members should make good contact with the stationary members; and as the former slides into the latter, a spreading of the stationary contact leaves should be visible. Switch action should be free. Wiping action of contacts usually removes any dirt at the point of contact.

b. Clean (C). Clean the exterior surfaces of switches with a stiff brush, moistened with dry-cleaning solvent (SD).

26. COILS.

a. Inspect (I). Inspect coils for cleanliness of the coil form and mounting supports. Check all connections and sliding clips for proper contact and spring tension.

b. Tighten (T). Tighten any loose coil mounting or connections by resoldering wires or tightening screws.

c. Clean (C). Clean the coil form and coil with a soft brush. Remember the ceramic coil form is actually performing the function of a high-voltage insulator, therefore the same preventive maintenance will apply to the coil as to high-voltage insulators and bushings. Clean sliding contacts with crocus cloth when corroded.

27. PONTENTIOMETERS.

a. Inspect (I).

(1) Inspect the mechanical condition of potentiometers R-31 and R-48. The arm should be keyed tightly to the shaft, and the shaft should turn easily in the bushing which supports it.

(2) Inspect the assembly and mounting screws, setscrews, and nuts.

(3) Examine the insulating body of the potentiometer for dust, dirt, cracks, and chipped places.

(4) Examine all metallic parts for dust, dirt, and corrosion.

b. Tighten (T). Tighten loose assembly or mounting screws.

c. Clean (C).

(1) Clean the exposed contact surfaces of the potentiometer and the connections whenever they are dirty or corroded.

(2) Remove grease and dirt from the potentiometer parts with dry-cleaning solvent (SD).

(3) If the contact surfaces are corroded, clean them with crocus cloth.

(4) Clean the contact surface of the arm.

(5) Clean the body of the potentiometer with a brush or cloth.

28. TERMINAL BLOCKS.

a. Inspect (I).

(1) Inspect terminal blocks for cracks, breakage, dirt, and loose connections or mounting screws.

(2) Carefully examine connections for mechanical defects, dirt, and corrosion.

b. Tighten (T). Tighten loose screws, lugs, and mounting bolts. When tightening screws, be sure to select a screwdriver of correct size; do not exert too much pressure. Remove loose connections and clean them when they are dirty or corroded.

c. Clean (C). Clean terminal blocks, when they require it, with a dry brush. When necessary, use a cloth moistened with a dry-cleaning solvent (SD). If a solvent is used, wipe the block thoroughly with a cloth, then brush it to remove the lint.

29. MULTIPLE CONNECTORS.

Multiple connectors and plugs are used to connect the receiver and transmitter to the power supply.

a. Inspect (I). Inspect the female ends of the connectors for corrosion and collected dust. Inspect the mountings for cracks and loose connections. Inspect the male ends for loose and broken pins and for proper spring in the banana plugs.

b. Clean (C). Clean the male and female ends of the connectors with a brush moistened in dry-cleaning solvent (SD). Remove corrosion with #0000 sandpaper, then wipe with a clean cloth.

30. CORDS AND CABLES.

The cables in Receiver-Transmitter BC-1335 are the life lines of the equipment. Closely observe condition of the cabling. Operating

equipment in all kinds of weather, and moving on all kinds of roads subjects cabling to a great deal of punishment.

a. Inspect (I). Inspect the cables for cracked or deteriorated insulation, frayed or cut insulation at the connecting and supporting points, and improper placement which places the cables or connections under strain. Also watch for kinks and improper supports.

b. Tighten (T). Tighten loose cable clamps, coupling rings, and cable connections.

c. Clean (C). Clean dirty or corroded connections on cables. Remove corrosion with #0000 sandpaper. Clean the **entire** surface of the connector. Make no attempt to remove individual prongs from cable plugs.

31. JACKS AND PLUGS.

Jacks require very little attention, and then only at infrequent intervals. Occasionally tighten the mounting nut, clean the contacts, or increase the spring tension. Remove dirt with a brush and dry-cleaning solvent (SD); remove corrosion with a piece of crocus cloth followed by a clean cloth. Increase spring tension, when necessary. Try the action of the jack after each adjustment. Be careful to keep all soldered connections intact. For cleaning telephone-type plugs use Polish, Metal, Paste Sig C Stock No. 6G1516.

32. CABINET, CHASSIS, AND MOUNTINGS.

The cabinet which houses Receiver-Transmitter BC-1335 is constructed of aluminum, coated with dull finish OD paint.

a. Inspect (I). Inspect the outside and inside of each cabinet thoroughly, paying strict attention to every detail. Check the panel screws. Inspect the panels for loose knobs, switches, and jacks.

b. Clean (C). Clean each cabinet, outside and in, with a clean, dry cloth. Use dry compressed air to blow out all accumulated dirt and dust. Replace any scratched, rusted, or chipped surface.

c. Tighten (T). Tighten all mounting bolts, panel screws, plugs, and control knobs found loose.

33. HEADSET AND MICROPHONE.

These auxiliary items of equipment are essential to the operation of the radio set, therefore the operator must give them the same care as the set itself.

a. Inspect (I). Inspect all external surfaces for dirt and corrosion. See that all cable connections are tight and that plugs and jacks fit together properly.

b Clean (C). Clean all items of the equipment in accordance with the instructions outlined previously for cords, jacks, cabinets, etc.

34. COUPLING SHAFTS AND CONTROL KNOBS.

The control of switches, and resistors, found throughout the set is effected through coupling shafts that connect these items to control knobs located on the front panels. It is important to keep these shafts and control knobs tight at all times. Use a screwdriver to tighten these items whenever they are loose.

SECTION VII. ITEMIZED PREVENTIVE MAINTENANCE

35. INTRODUCTION.

For case and efficiency of performance, preventive maintenance on Receiver-Transmitter BC-1335 will be broken down into operations that can be performed at different time intervals. In this section the preventive maintenance work to be performed on the radio set at the specific time intervals is broken down into units of work called items. The general techniques involved and the application of the FITCAL operations in performing preventive maintenance on individual parts are discussed in section VI. These general instructions are not repeated in this section. When performing preventive maintenance, refer to section VI if more information is required for the following items. Perform all work with the power removed from the equipment. After preventive maintenance has been performed on a given day, put the equipment into operation and check it for satisfactory performance. (See paragraph 17, Equipment Performance List.)

36. PREVENTIVE MAINTENANCE TOOLS AND MATERIALS.

The following preventive maintenance tools and materials will be needed.

Common hand tools
Clean cloth
#0000 sandpaper
Crocus cloth
Contact burnishing tool
Paste metal polish (Signal Corps stock No. 6G1516)
Dry-cleaning solvent (SD)
Carbon tetrachloride (when used)
Camel's-hair brush
Emery cloth

NOTE: Gasoline will not be used as a cleaning fluid for any purpose. Dry-cleaning solvent (SD) is available as a cleaning fluid through established supply channels. Oil, Fuel, Diesel, may be used for cleaning purposes when dry-cleaning solvent (SD) is not at hand. Carbon tetrachloride will be used as a cleaning fluid only on electrical wiring and electrical mechanisms which cannot be cleaned with an inflammable solvent because of the fire hazard.

37. ITEM 1, EXTERIOR OF SET.

OPERATIONS.

IC	Case.
ITC	Water-seal jacks.
ITC	Catch-clips.
IT	Screws, bolts, nuts.
IC	Cords and cabling.
ITC	Connectors.
ITC	Terminals.
ITC	Dust caps.

38. ITEM 2, PANEL CONTROLS.

OPERATIONS.

ITC	Water-seal jacks.
ITC	VOLUME control.
ITC	CHANNEL selector switch.
ITC	Voltage selector switch.

39. ITEM 3, TUBES.

OPERATIONS.

ITC	Shields and springs.
IC	Sockets.

40. ITEM 4, CRYSTALS.

OPERATIONS.

ITC	Clamp.
IC	Holder.
I	Spare crystals.

41. ITEM 5, CAPACITORS.

OPERATIONS.

ITC	Fixed capacitors.
ITC	Mountings.
IC	Leads.
IC	Case.
IC	Variable capacitor plates.
IT	Screws, nuts, bolts.

REMARKS. Use dry-cleaning solvent (SD) to remove stubborn dirt. Use Bristo wrench mounted on top of the power transformer to tighten setscrews in the two SETTING NO. 7 knobs.

42. ITEM 6, RESISTORS.

OPERATIONS.

I	Bodies.
ITC	Leads.
ITC	Mountings and connections.

REMARKS. Resistors with discolored bodies cannot be cleaned; replace them. Do not try to move resistors with pigtail connections; there is danger of breaking connections at the point at which they enter the body.

43. ITEM 7, SWITCHES.

OPERATIONS.

IC	Contacts.
IC	Exterior surfaces.
IC	Corroded connections.
ITC	Locknuts on mounting.
IC	Bearing surface of rotary switch shaft.

REMARKS. Do not pry the leaves of the rotary switch apart. When switch contacts have deep pits caused by arcing or burning, use a burnishing tool or crocus cloth to resurface them.

44. ITEM 8, FUSE.

OPERATIONS.

I	Metal contact caps.

REMARKS. Replace fuse if cap is loose, or if fuse is burned out.

45. PREVENTIVE MAINTENANCE CHECK LIST.

The following check list is a summary of the preventive maintenance operations to be performed on Receiver-Transmitter BC-1335. The time intervals shown on the check list may be reduced at any time by the local commander. For best performance of the equipment, perform operations at least as frequently as called for in the check list. The echelon column indicates which operations are first echelon maintenance and which operations are second echelon maintenance. Operations are indicated by the letters of the word FITCAL. For example, if the letters ITCA appear in the operations column, the item to be treated must be inspected (I), tightened (T), cleaned (C), and adjusted (A).

Item No.	Operations	Item	When performed					Echelon
			Daily	Weekly	Monthly	Semi-annually	Yearly	
1	ITC	Exterior of set..	X					1st
2	ITC	Panel controls..	X					2d
3	ITC	Tubes.....		X				2d
4	ITC	Crystals.....			X			2d
5	ITC	Capacitors.....			X			2d
6	ITC	Resistors.....			X			2d
7	IC	Switches.....			X			2d
8	I	Fuse.....			X			2d

F Feel* I Inspect T Tighten C Clean A Adjust* L Lubricate*

*The Feel, Adjust and Lubricate operations are inapplicable to Receiver-Transmitter BC-1335.

SECTION VIII. LUBRICATION

46. LUBRICATION.

No War Department Lubrication Order is prescribed for Receiver-Transmitter BC-1335.

SECTION IX. SPECIAL TOOLS

47. BRISTO WRENCH.

This wrench (fig. 42), supplied with the receiver-transmitter, is mounted on top of the power transformer. It is used only to tighten pointer assemblies on the air trimmers of SETTING NO. 7.

48. ALIGNMENT TOOL.

The alignment tool is a small screwdriver included in the maintenance kit (par. 97) which is used only for alignment.

49. ABRASIVE TOOLS.

Crocus-cloth, canvas-cloth, and sandpaper sticks are constructed in the following manner (fig. 13):

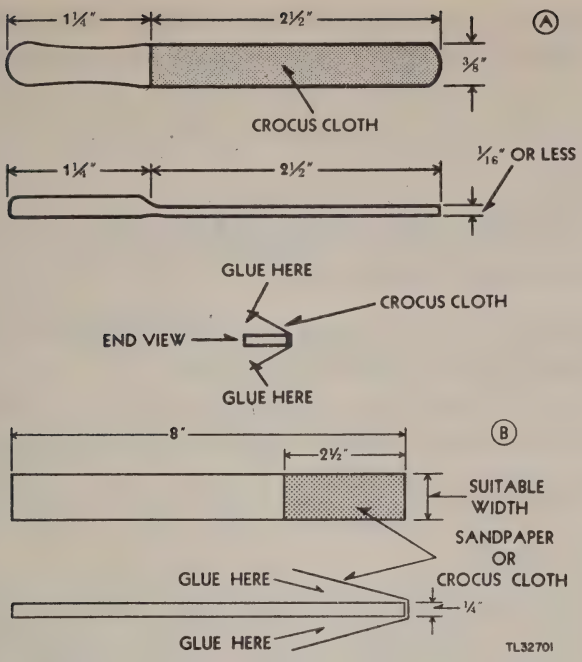


Figure 13. Construction of abrasive tools.

a. Use a piece of wood (or suitable substitute) 3¾ inches long, ⅜ inch wide, and 1/16 inch (or less) thick.

b. Cut a piece of crocus cloth as shown in figure 13 and cement it to the stick. Be sure to cover both sides of the stick.

c. Place the stick in a vise and allow the cement to harden.

d. Cut off any crocus cloth which extends over the edge of the stick.

e. Figure 13-A shows the finished tool.

50. SOLDERING TIP.

Refer to paragraph 67b for instructions on the construction of a special soldering tip.

SECTION X. MOISTUREPROOFING AND FUNGIPROOFING

51. GENERAL.

When operated in tropical areas where temperature and rela-

tive humidity are extremely high, Signal Corps equipment requires special attention. These are some of the problems met:

a. Resistors, capacitors, coils, chokes, transformer windings, etc., fail because of the effects of fungus growth and excessive moisture.

b. Electrolytic action, often visible in the form of corrosion, takes place in resistors, coils, chokes, transformer windings, etc., causing eventual break-down.

c. Hook-up wire insulation and cable insulation break down. Fungus growth accelerates deterioration.

d. Moisture forms electrical leakage paths on terminal boards and insulating strips, causing flash-overs and crosstalk.

e. Moisture provides leakage paths between battery terminals.

52. TREATMENT.

A moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection against fungus growth, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture- and fungi-resistant varnish applied with a spray gun or brush. Refer to TB SIG 13, Moistureproofing and Fungiproofing Signal Corps Equipment, for a detailed description of the varnish-spray method of moistureproofing and fungiproofing and the supplies and equipment required in this treatment.

CAUTION: Varnish spray may have poisonous effects if inhaled. To avoid inhaling spray, use respirator if available; otherwise, fasten cheesecloth or other cloth material over nose and mouth. Never spray varnish or lacquer near an open flame. Do not smoke in a room where varnish or lacquer is being sprayed. The spray may be highly explosive.

53. RECEIVER-TRANSMITTER BC-1335.

a. Preparation. Make all repairs and adjustments necessary for proper operation of the equipment.

b. Disassembly.

(1) Case. Remove top cover held by 8 catch-clips. Remove bottom cover held by 12 screws.

(2) Top.

(a) Remove two crystals; mark correct way to replace them on chassis.

(b) Remove spare fuses.

(c) Remove Bristo wrench mounted on top of power transformer.

(d) Remove shields from i-f (intermediate frequency) coils T-2, T-3, and T-4 by removing locknut, nut, and lockwasher on top of shields, and removing two mounting screws on the sides of the shields. Replace two mounting screws and remove fiber insulator from around coil.

(e) Remove vibrators.

(f) Remove test prod from holder.

(g) Remove Tube JAN-0B3/VR90 and two regulator tubes 3H-1-7.

(3) *Bottom.*

(a) Remove power supply cover held by 12 screws.

(b) Remove four bias cells from holders.

c. Cleaning. Clean all dirt, dust, rust, and fungus from the equipment to be processed. Clean all oil and grease from the surfaces to be varnished.

d. Masking (figs. 14 and 15).

(1) *Top.*

(a) Mask crystal sockets.

(b) Mask screws on i-f coils T-2, T-3, and T-4. Also small slot on bottom of coil forms.

(c) Mask vibrator socket.

(d) Mask test prod tip.

(e) Mask sockets of Tube JAN-0B3/VR90 and two regulator resistors 3H-1-7.

(f) Mask metering strip to cover holes.

(g) Mask air trimmer knobs C-4 and C-5 (SETTING NO. 7) to cover pointers and protect bearings, but leave upper part uncovered to permit spraying above lower metal sleeve.

(h) Mask counters on SETTING NOS. 1, 2, 3, 4, 5, and 6 (A and B), covering completely down to the metal shields.

(i) Mask tuning lamp (resonance indicator) and two spare lamps.

(j) Mask lid of spare tube compartment and wingnut.

(k) Mask top of indicator (eye) tube.

(l) Mask alignment and align—operate switches.

(m) Mask wingnut and Bristo wrench holder on top of power transformer.

(n) Mask holes in top of tube shields.

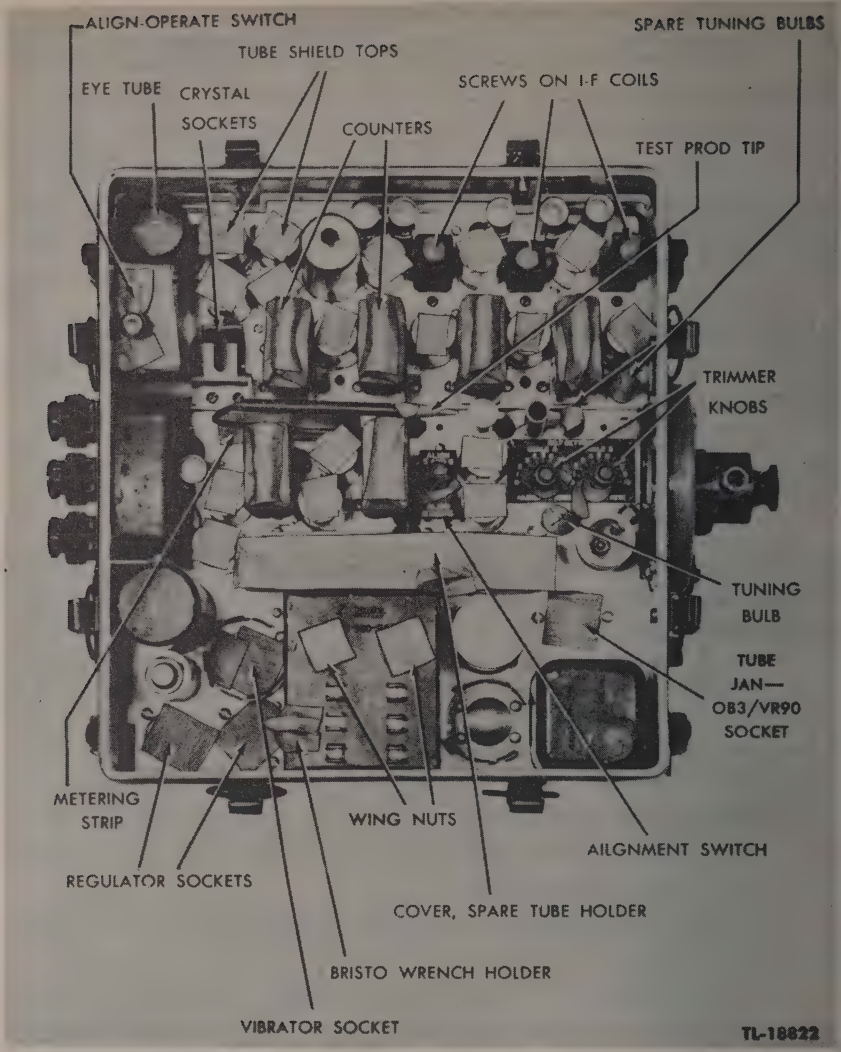


Figure 14. Receiver-Transmitter BC-1335, top view, masked for varnish spraying.

(2) Bottom (fig. 15).

(a) Mask switches S-5A, S-5B, and S-5C in power supply compartment.

(b) Mask ceramic trimmers C-1, C-58, C-61, C-8, C-9, and C-12.

(c) Mask all sections of channel switches S-2A and S-2J, inclusive.

(d) Mask trimmers C-4 and C-5.
(e) Mask VOLUME control.
(f) Mask bias cell holders.
(g) Mask adjustment on resistor R-48.

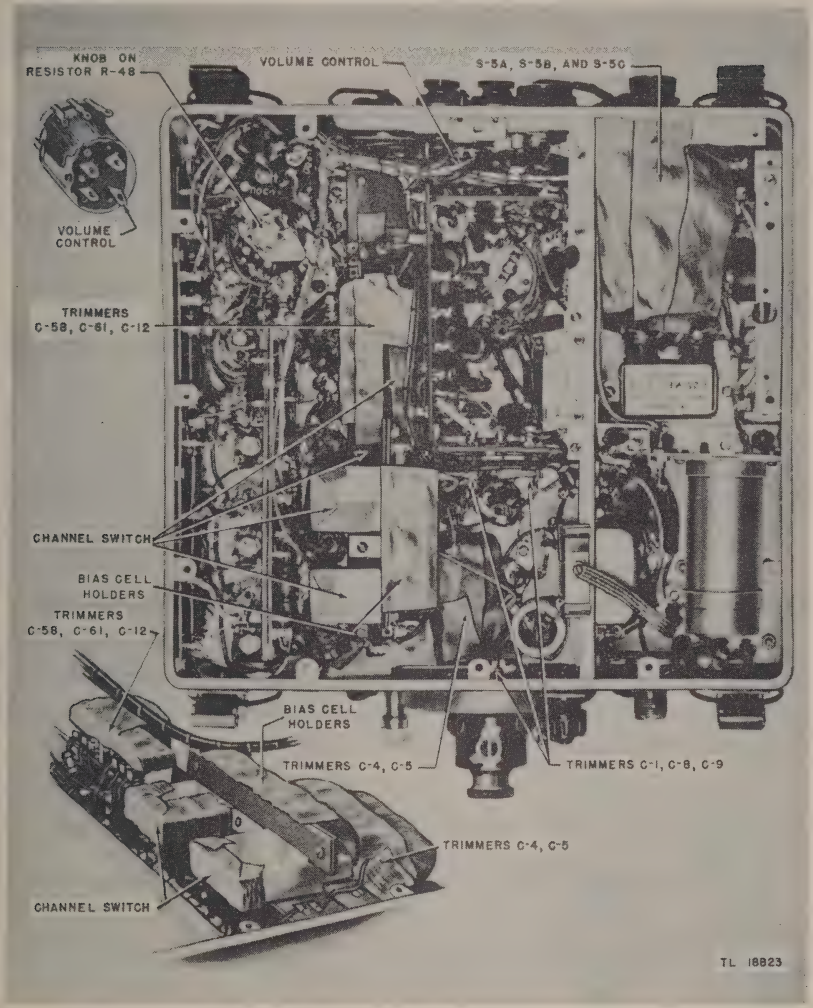


Figure 15. Receiver-Transmitter BC-1335, bottom view, masked for varnish spraying.

e. Drying. Place equipment in oven or under heat lamps and dry for 2 or 3 hours at 160° F. Do not exceed 160° F.

CAUTION: If wax begins to melt in any of the components, decrease the temperature and increase the baking time approximately 1 hour for each 10° F drop in temperature.

f. Varnishing.

(1) Spray on three coats of moistureproofing and fungiproofing varnish (Lacquer, Fungus-resistant, Spec. No. 71-2202 (Stock No. 6G1005.3), or equal). Allow each coat to air-dry for 15 or 20 minutes before applying the next coat.

(2) Apply varnish immediately after the equipment is dried. If varnish is not applied immediately, moisture condenses on the equipment. Varnish applied over the moisture peels off readily after the varnish has dried.

(3) Upon completion of spraying, touch up with brush those portions not reached by spray, especially around coil forms. Also touch up with a brush all solder connections on voltage selector switches, S-5A, S-5B, and S-5C, and solder connections on vibrator socket.

g. Reassembly.

(1) Remove all masking tape, being careful not to peel varnish from near-by areas.

(2) Reassemble the set and test its operation.

h. Marking. Mark the letters MFP and the date of treatment above the nameplate.

EXAMPLE: MFP—8 Dec 44.

54. MOISTUREPROOFING AND FUNGIPROOFING AFTER REPAIRS.

If, during repair, the coating of protective varnish has been punctured or broken, and if complete treatment is not needed to reseal the equipment, apply a brush coat to the affected part. Be sure the break is completely sealed.

PART FOUR

AUXILIARY EQUIPMENT

55. AUXILIARY EQUIPMENT.

The only equipment auxiliary to Receiver-Transmitter BC-1335 is Remote Control Equipment RC-261. Refer to TM 11-2632.

Figure 16. Receiver-Transmitter BC-1335, complete block diagram.

PART FIVE

REPAIR INSTRUCTIONS

NOTE: Failure or unsatisfactory performance of equipment used by Army Ground Forces and Army Service Forces will be reported on W.D., A.G.O. Form No. 468 (Unsatisfactory Equipment Report); by Army Air Forces, on Air Forces Form No. 54 (unsatisfactory report). If either form is not available, prepare the data according to the sample form reproduced in figure 54.

SECTION XI. THEORY OF EQUIPMENT

56. TREATMENT OF THEORY.

The functional theory of Receiver-Transmitter BC-1335 is treated in two ways. The first is a condensed circuit analysis keyed to a block diagram (fig. 16) which shows signal paths. It can be used for introductory or quick review purposes. The second presents a detailed analysis of each functional circuit used in Receiver-Transmitter BC-1335.

57. CONDENSED THEORY OF OPERATION.

a. Receiver-Transmitter BC-1335 consists of a number of interlocking circuits which provide rapid change-over from receive to transmit. Either of two predetermined channels, or operating frequencies can be used. Channels can be changed instantaneously without turning off the set by using the CHANNEL selector switch on the control panel. The block diagram in figure 16 shows the signal paths through the transmitter and receiver. The same antenna is used for both transmission and reception.

b. During reception the incoming signal is passed through r-f amplifier tubes V-6 and V-7 to the grid of the mixer tube V-8. The fourth harmonic of the output of crystal oscillator tube V-15 is amplified by crystal oscillator amplifier V-14, which feeds into the injector grid of the mixer tube V-8. The beat produced by these two signals in the mixer tube is 4.3 mc (with no signal modulation) and is amplified by i-f amplifier tubes V-9, V-10, and their associated transformers. The output of the last amplifier, V-10, is fed into limiter tube V-11 which insures that a constant amplitude signal is supplied to discriminator circuit tubes V-12 and V-13. The audio output of the discriminator is then amplified by the p-a (power amplifier) section of tube V-13, and is applied to the headset.

c. Three separate outputs are taken from the discriminator: the audio output; the voltage applied to the grid of the d-c amplifier V-17; and the voltage applied to the discriminator test point, which is provided for convenience in alignment. When the microphone press-to-talk switch is depressed the output of d-c amplifier V-17 and that of bias oscillator V-16 are combined to apply an automatic-frequency-control (a-f-c) voltage which is applied to the grid of reactance modulator tube V5 to control the resting frequency of the transmitter oscillator, V-4.

d. In the transmit position, the same reactance modulator, V-5, is excited by an audio signal from the microphone. The reactance tube frequency modulates the output of the master oscillator at an audio rate. The modulated signal then passes through doubler tube V-3 and transmitter p-a tubes V-1 and V-2, to the antenna system. A **small portion** of the r-f output is fed back into the receiver and appears at the discriminator, which controls the transmitter oscillator center frequency through tubes V-17 and V-16 as described in subparagraph c above. Thus, receiver and transmitter interlock during transmission.

58. RECEIVER CIRCUIT.

The f-m receiver is a superheterodyne with an intermediate frequency of 4.3 mc (fig. 17). The receiver covers a frequency range of 27.0 to 38.9 mc. This range is divided into 120 channels spaced 100 kc apart. A limiter circuit is used to remove traces of amplitude variations or noise in received signals. A crystal-controlled injector circuit is used to make sure the receiver is tuned to the proper channel, and to minimize frequency drift.

59. ANTENNA CIRCUIT.

a. The antenna circuit (fig. 18) consisting of coil L-1, capacitor C-1, coil L-2, coil L-4 and capacitor C-4 or C-5 serves the purpose of coupling the various antenna systems into either r-f amplifier tube V-6 or plates of the transmitter p-a tubes, V-1 and V-2. If a vehicular antenna is coupled into concentric cable coupling J-2, the input is effected through the inductive coupling between coils L-2 and L-4. Coil L-1 and capacitor C-1 are resonant at approximately the same frequency as the antenna. The constants have been so chosen that at any frequency over the range covered, the series reactance of L-1 and C-1 will exactly cancel the reactance of those recommended antenna systems which connect to the antenna post. This feature makes retuning of the equipment unnecessary when the recommended antenna systems are interchanged, and makes a single antenna operate over the entire frequency range.

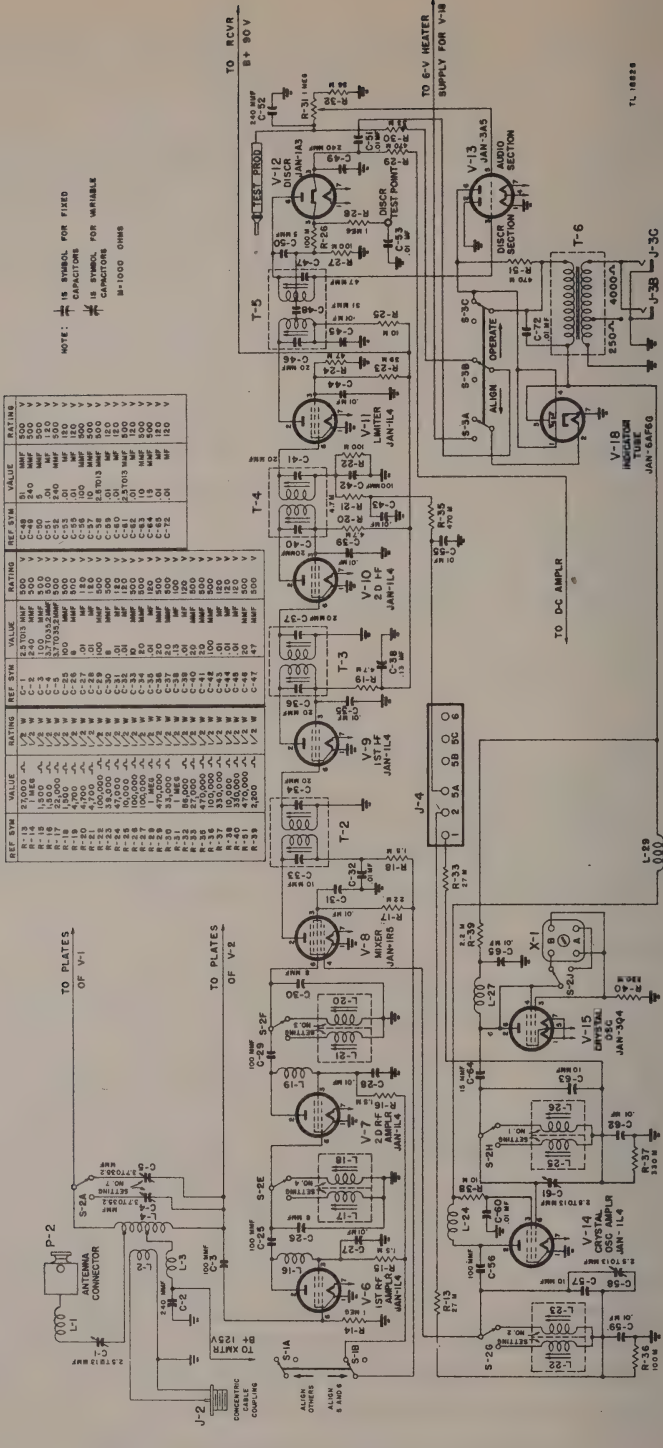
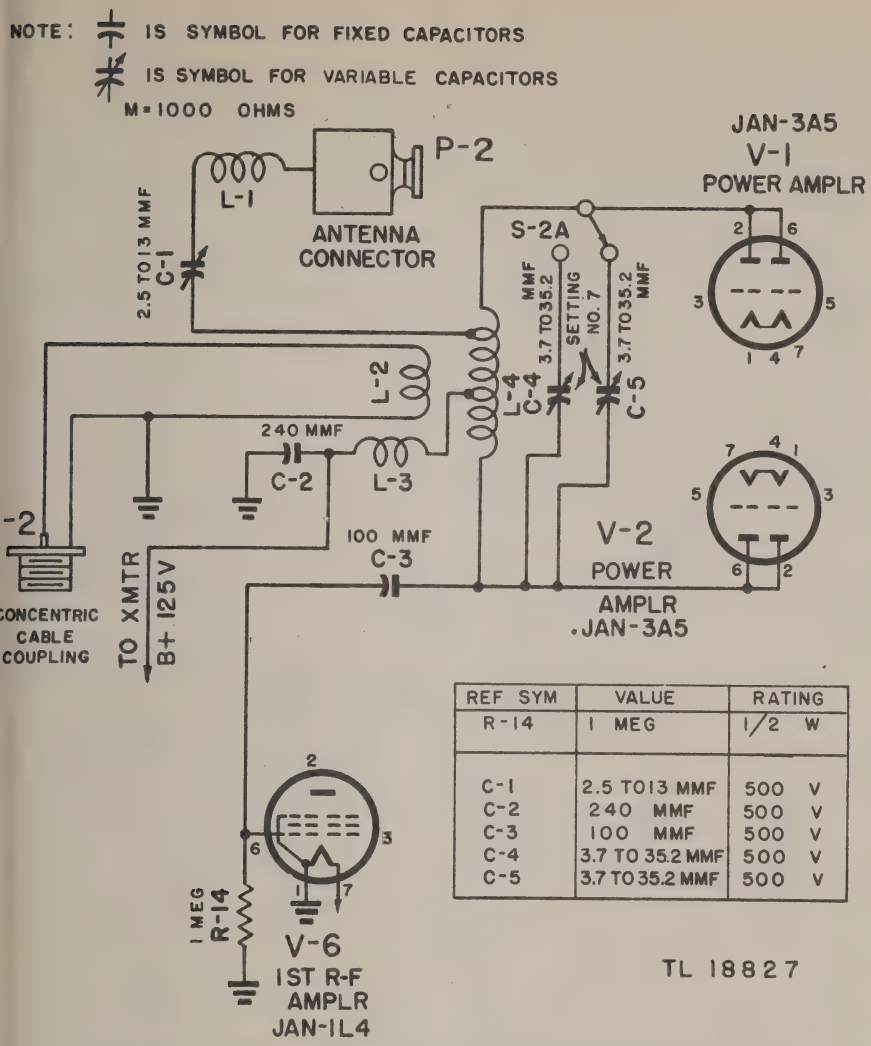


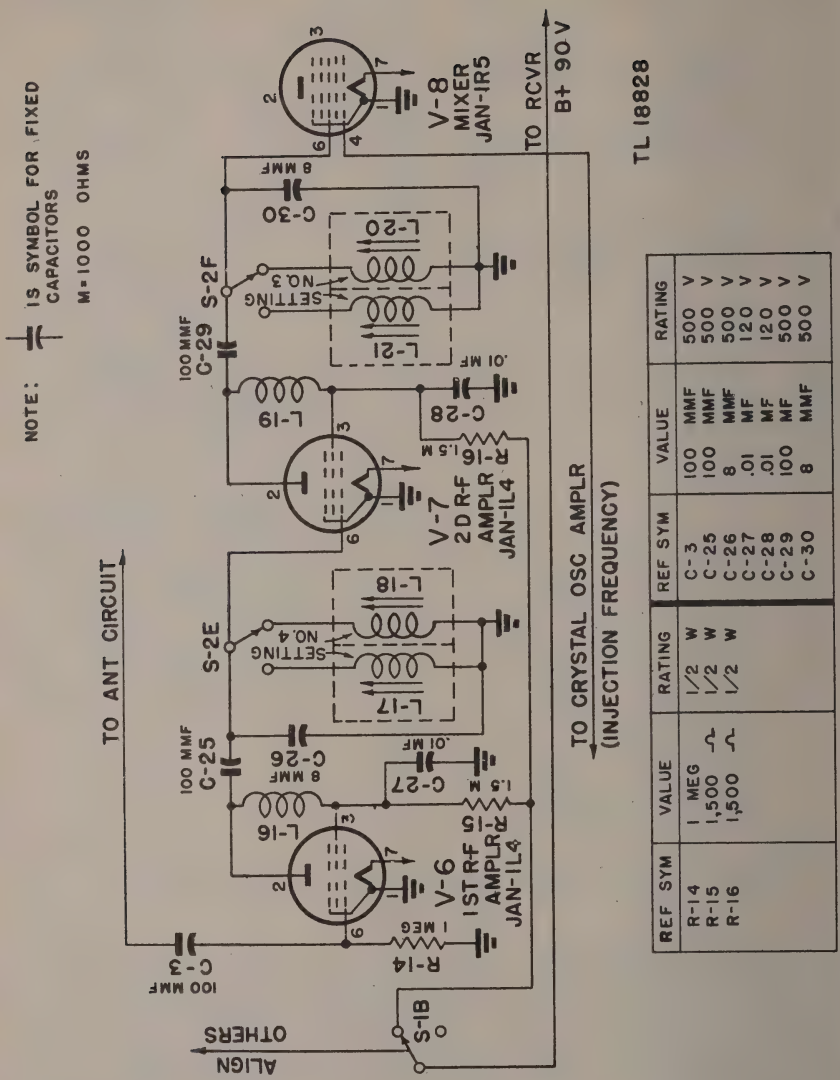
Figure 17. Receiver-Transmitter BC-1335, receiver.



REF SYM	VALUE	RATING
R-14	1 MEG	1/2 W
C-1	2.5 TO 13 MMF	500 V
C-2	240 MMF	500 V
C-3	100 MMF	500 V
C-4	3.7 TO 35.2 MMF	500 V
C-5	3.7 TO 35.2 MMF	500 V

Figure 18. Receiver-Transmitter BC-1335, receiver antenna circuit.

b. Coil L-1 and capacitor C-1 are the impedance-tracking network for antennas connected to the antenna post. Capacitor C-1 is adjusted at the factory **and must not be changed.** L-4 is the final tank coil for the r-f power amplifier and the antenna coil for the receiver. It is tapped at a fixed point for coupling to the L-1, C-1 network for proper impedance matching, and is coupled to the vehicular antenna cable coupling J-2 through coil L-2, which is a half-turn wound on the form with L-4. Capacitor C-4 or C-5 is selected by CHANNEL switch S-2A to tune L-4 to resonance on the channel frequencies.



REF SYM	VALUE	RATING
R-14	1 MEG	1/2 W
R-15	1,500 Ω	1/2 W
R-16	1,500 Ω	1/2 W

REF SYM	VALUE	RATING
C-3	100 MMF	500 V
C-25	100 MMF	500 V
C-26	8 MMF	500 V
C-27	.01 MF	120 V
C-28	.01 MF	120 V
C-29	100 MF	500 V
C-30	8 MMF	500 V

Figure 19. Receiver-Transmitter BC-1335, receiver r-f amplifier.

60. R-F AMPLIFIER STAGES.

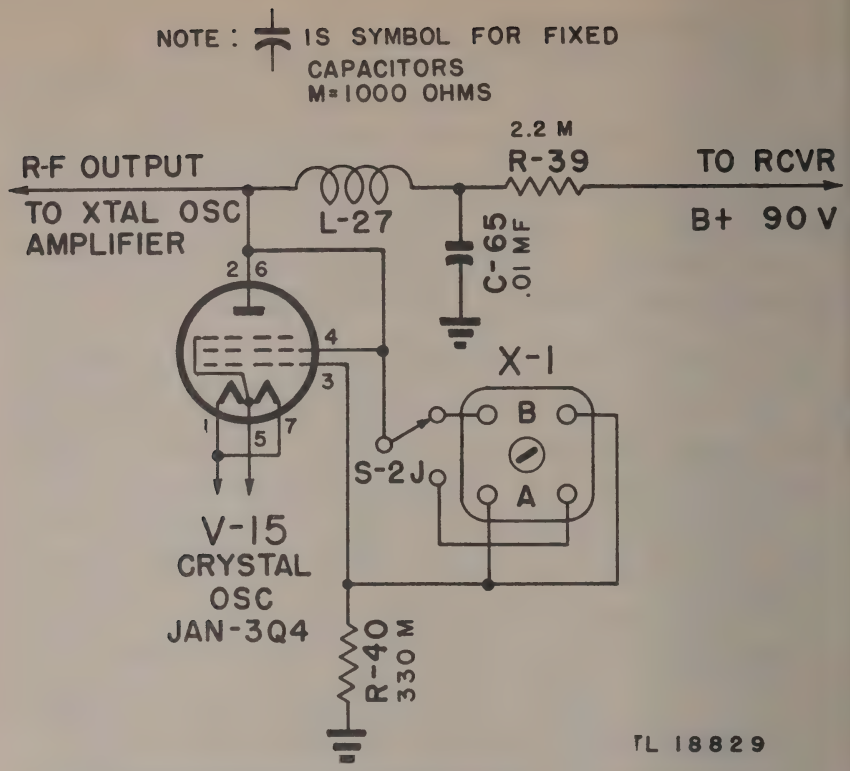
a. Receiver r-f amplifier tubes V-6 and V-7 (fig. 19) increase the amplitude of the received signal before it is applied to mixer tube V-8. This amplifier improves the receiver sensitivity and reduces image response and other unwanted responses. As a safety precaution the r-f signal, which reaches the receiver when transmitting, draws sufficient grid current through resistor R-14 to reduce sensitivity of the r-f amplifier and prevent excessive transmitting signal feedback to the receiver circuit.

b. The signal from the antenna circuit is applied through capacitor C-3 and resistor R-14 to the grid of tube JAN-1L4 (V-6). The plate of this tube is fed through r-f choke L-16 from the screen voltage on the tube, which is supplied through the r-f filter consisting of resistor R-15 and capacitor C-27. It is supplied from the receiver plate supply of 90 volts. The output of tube V-6 is coupled into a resonant circuit consisting of capacitor C-26 and coil L-17 or L-18 through coupling capacitor C-25. This resonant circuit is tuned with adjustable powdered iron cores and feeds the grid of Tube JAN-1L4 (V-7), the second r-f amplifier. The plate circuit of V-7 is similarly fed through plate choke L-19 from the screen voltage of V-7 which is supplied through the r-f filter circuit consisting of resistor R-16 and capacitor C-28. Alignment switch S-1B removes the plate voltage from these stages during the presetting procedure. The output of V-7 is coupled into a resonant circuit consisting of capacitor C-30 and coil L-20 or L-21 through capacitor C-29, and this resonant circuit is coupled to the signal grid of mixer Tube JAN-1R5 (V-8).

61. CRYSTAL OSCILLATOR.

a. Crystal oscillator Tube JAN-3Q4 (V-15) is connected as a Pierce oscillator (fig. 20). Either of two crystals is selected by CHANNEL switch S-2J, which connects these crystals directly between the plate and control grid of the oscillator tube. The crystal serves as a tuned circuit of high Q replacing the conventional coil and tuning capacitor.

b. Plate voltage on crystal oscillator V-15 is fed through r-f choke L-27. This plate supply voltage is fed from the receiver plate voltage through the r-f filter, resistor R-39 and capacitor C-65. The plate and screen of V-15 are connected together, converting the tube for triode operation. Rectified grid current flows through resistor R-40, which is connected between control grid and ground, providing grid bias to prevent overloading the tube.



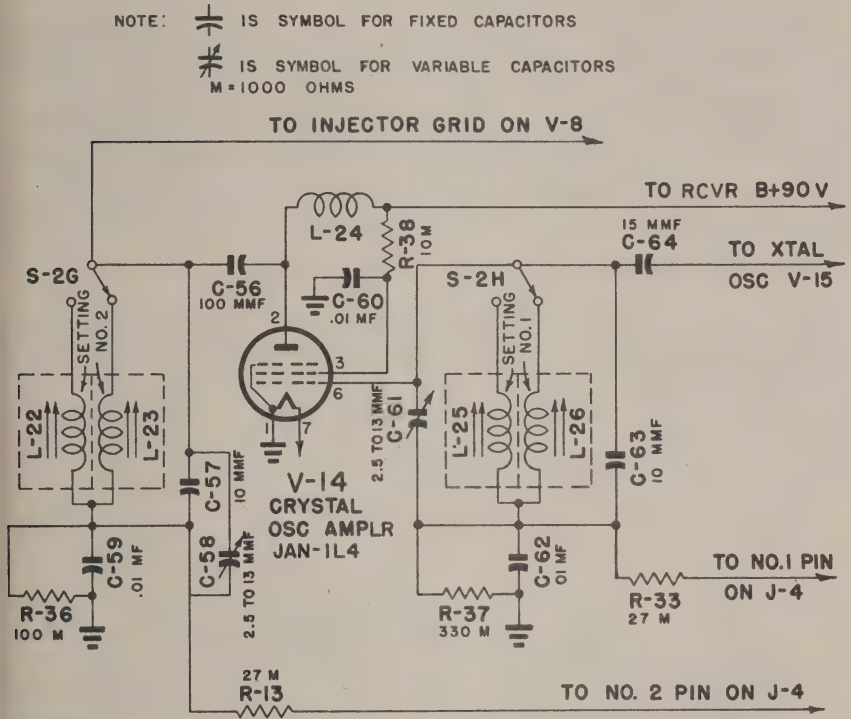
REF SYM	VALUE	RATING
R-39	2,200 Ω	1/2 W
R-40	330,000 Ω	1/2 W
C-65	.01 MF	120 V

Figure 20. Receiver-Transmitter BC-1335, receiver crystal oscillator.

62. CRYSTAL OSCILLATOR AMPLIFIER.

a. The crystal oscillator amplifier is supplied with a tuned plate circuit and a tuned grid circuit (fig. 21). Both are tuned to the fourth harmonic of crystal oscillator V-15. The screen supply of crystal oscillator amplifier Tube JAN-1L4 (V-14) is fed through the r-f filter consisting of resistor R-38 and capacitor C-60. The low screen voltage supplied and the relatively high bias developed across resistor R-37 cause the tube to act as a limiter; the output will remain constant over a wide range of input values which may result from various crystal activities in the crystal oscillator. The output of oscillator amplifier V-14 is fed into the injector grid of mixer tube V-8.

b. The input of the oscillator amplifier is coupled to the output of crystal oscillator V-15 through coupling capacitor C-64. Capacitor C-63, in parallel with C-61 and coil L-25 or L-26, is resonant to the fourth harmonic of the crystal oscillator. Tuning is done by means of powdered iron cores in the coils. Rectified grid current flowing through R-37 provides bias for V-14. Resistor R-37 is bypassed by C-62 to increase the r-f voltage appearing on the control grid of V-14. The screen supply of V-14 is fed from the



REF SYM	VALUE	RATING
R-13	27,000 Ω	1/2 W
R-33	27,000 Ω	1/2 W
R-36	100,000 Ω	1/2 W
R-37	330,000 Ω	1/2 W
R-38	10,000 Ω	1/2 W

REF SYM	VALUE	RATING
C-56	100 MMF	500 V
C-57	10 MMF	500 V
C-58	2.5 TO 13 MMF	500 V
C-59	.01 MF	120 V
C-60	.01 MF	120 V
C-61	2.5 TO 13 MMF	500 V
C-62	.01 MF	120 V
C-63	10 MMF	500 V
C-64	15 MMF	500 V

TL 18830

Figure 21. Receiver-Transmitter BC-1335, receiver crystal oscillator amplifier.

receiver plate supply through the r-f filter consisting of resistor R-38 and capacitor C-60. The plate of V-14 is coupled through C-56 to a circuit consisting of capacitors C-57 and C-58 in parallel, and coil L-22 or L-23. This circuit is also tuned to the fourth harmonic of the crystal oscillator frequency. The output of this

circuit is connected directly to the injector grid of tube V-8. Capacitor C-59 is the r-f bypass for resistor R-36, and insures maximum injection voltage on mixer tube V-8.

63. MIXER.

a. Mixer Tube JAN-1R5 (V-8) is supplied with signal frequency voltage from the r-f amplifier and with injection frequency voltage from the crystal oscillator amplifier (fig. 22). These voltages are supplied on two separate grids. The frequency from the oscillator amplifier is always 4.3 mc below the signal frequency except for deviations due to frequency modulations of the signal. The output of tube V-8 consists of various combinations of these two frequencies. These combinations include sum and difference frequencies plus sums and differences of harmonics of both input frequencies. Transformer T-2 is tuned to select only the **difference frequency** of 4.3 mc. It is this frequency that is fed into the i-f amplifier.

REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-17	22,000 Ω	1/2 W	C-31	.01 MF	120 V
R-18	1,500 Ω	1/2 W	C-32	.01 MF	120 V
			C-33	10 MMF	500 V
			C-34	20 MMF	500 V

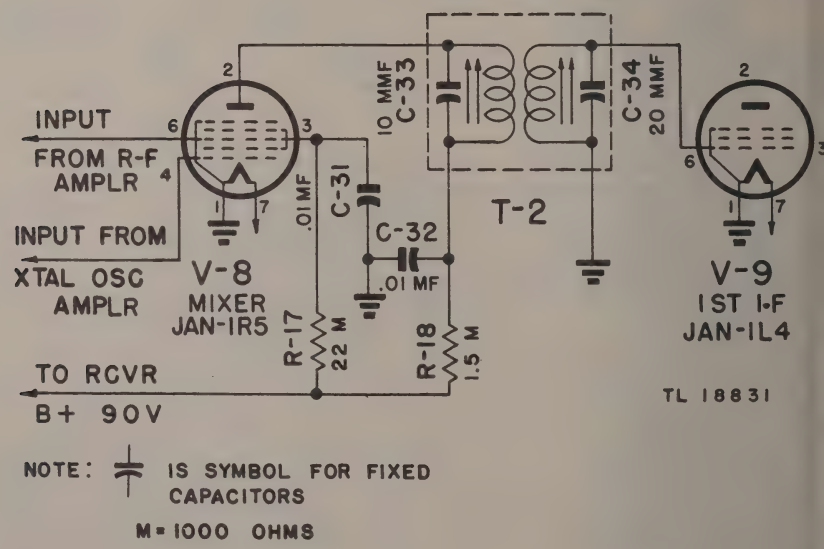
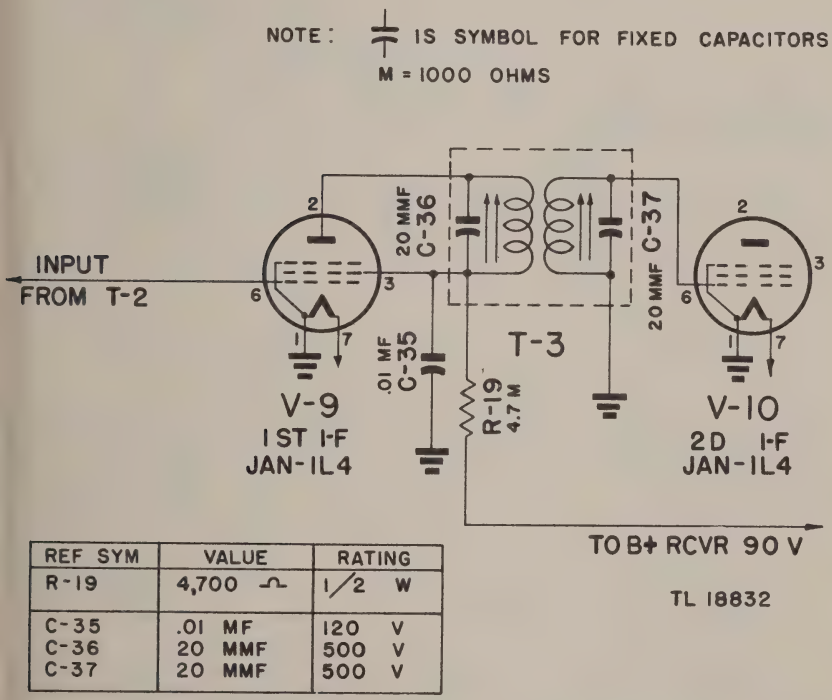


Figure 22. Receiver-Transmitter BC-1335, receiver mixer.

b. The input to the control and injector grids of tube V-8 is derived from the r-f and crystal amplifier circuits respectively. The screen voltage on tube V-8 is supplied through the r-f filter consisting of resistor R-17 and capacitor C-31, and the plate voltage is supplied through the r-f filter resistor R-18 and capacitor C-32 in series with the primary of T-2. The primary and secondary of T-2 are tuned by fixed capacitors C-33 and C-34, and by adjustable powdered iron cores. The output of T-2 is connected to the control grid of first i-f tube V-9.

64. FIRST INTERMEDIATE-FREQUENCY STAGE.

a. First i-f amplifier Tube JAN-1L4 (V-9) amplifies the output of mixer tube V-8, and improves selectivity of the i-f channel by addition of two tuned circuits (fig. 23). The output of this amplifier goes to the grid of second i-f amplifier tube V-10.



REF SYM	VALUE	RATING
R-19	4,700 Ω	1/2 W
C-35	.01 MF	120 V
C-36	20 MMF	500 V
C-37	20 MMF	500 V

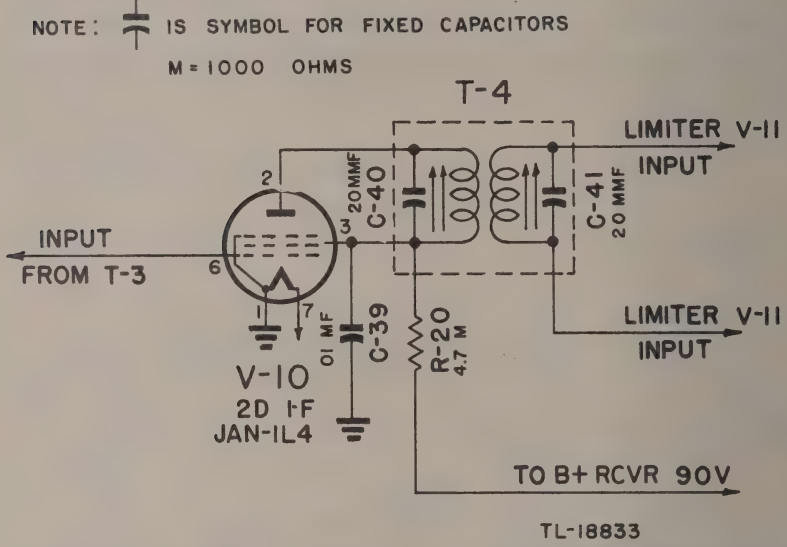
Figure 23. Receiver-Transmitter BC-1335, receiver first i-f amplifier.

b. The grid of first i-f amplifier Tube JAN-1L4 (V-9) is fed from the secondary of transformer T-2 at 4.3 mc (with no signal modulation). The screen voltage is supplied through the r-f filter consisting of resistor R-19 and capacitor C-35, and the plate volt-

age of the tube is supplied from this screen voltage through the primary of transformer T-3. T-3 is a double-tuned transformer consisting of two tuned circuits with fixed capacitors C-36 and C-37, and adjustable inductances tuned by powdered iron cores.

65. SECOND INTERMEDIATE-FREQUENCY AMPLIFIER.

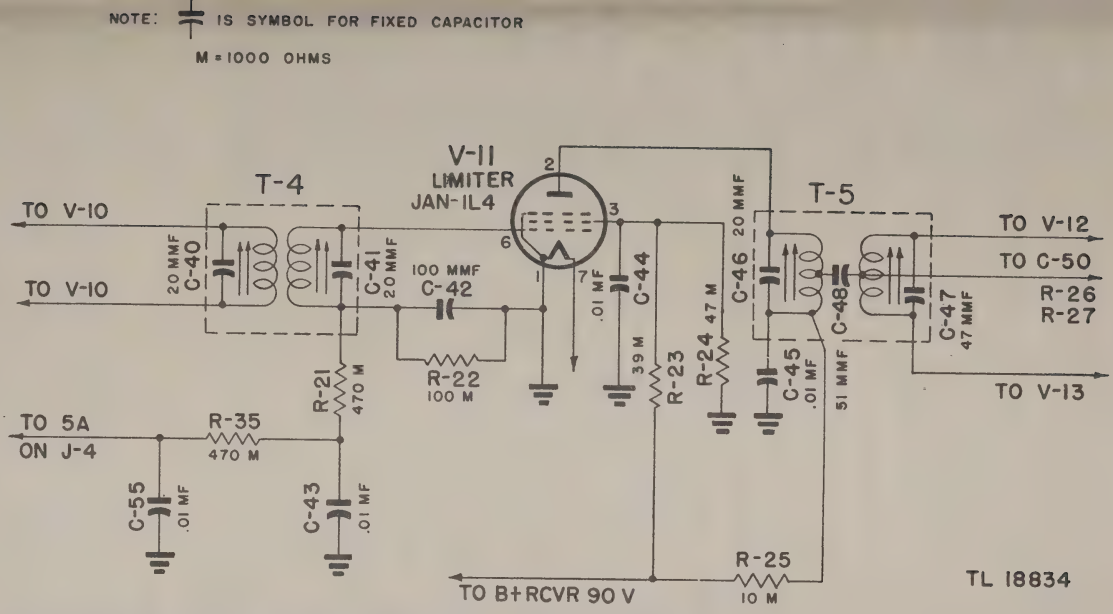
a. Second i-f amplifier Tube JAN-1L4 (V-10) amplifies the output of first i-f amplifier V-9. The addition of the two tuned circuits of T-4 (fig. 24) further increases the selectivity of the i-f system. The output of the second i-f amplifier is fed into the grid of limiter Tube JAN-1L4 (V-11).



REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-20	4,700 Ω	1/2 W	C-39	.01 MF	120 V
			C-40	20 MMF	500 V
			C-41	20 MMF	500 V

Figure 24. Receiver-Transmitter BC-1335, receiver second i-f amplifier.

b. The grid of second i-f amplifier Tube JAN-1L4 (V-10) is fed from the first i-f amplifier V-9 through transformer T-3. The screen voltage on tube V-10 is supplied through the r-f filter, resistor R-20 and capacitor C-39. The plate voltage on V-10 is supplied from this screen voltage through the primary of transformer T-4. T-4 is a double-tuned transformer which is composed of fixed capacitors C-40 and C-41 and adjustable inductances tuned by powdered iron cores.



REF SYM	VALUE	RATING
R-21	470,000 Ω	1/2 W
R-22	100,000 Ω	1/2 W
R-23	39,000 Ω	1/2 W
R-24	47,000 Ω	1/2 W
R-25	10,000 Ω	1/2 W
R-35	470,000 Ω	1/2 W

REF SYM	VALUE	RATING
C-40	20 MMF	500 V
C-41	20 MMF	500 V
C-42	100 MMF	500 V
C-43	.01 MF	120 V
C-44	.01 MF	120 V
C-45	.01 MF	120 V
C-46	20 MMF	500 V
C-47	47 MMF	500 V
C-48	51 MMF	500 V
C-55	.01 MF	120 V

Figure 25. Receiver-Transmitter BC-1335, receiver limiter.

66. LIMITER TUBE.

a. The grid of limiter Tube JAN-1L4 (V-11) is fed from the second amplifier through transformer T-4 and the parallel resistor and capacitor combination, R-22 and C-42 (fig. 25). The output of this tube remains substantially independent of the amplitude of the applied signal because of the reduced screen voltage used and the resistor-capacitor combination in the grid circuit. Thus variations in amplitude of the incoming signal do not affect the voltage applied to the discriminator circuit. Static, internal noise in the equipment, and other interference, all of which affect the amplitude of the incoming signal, are materially reduced.

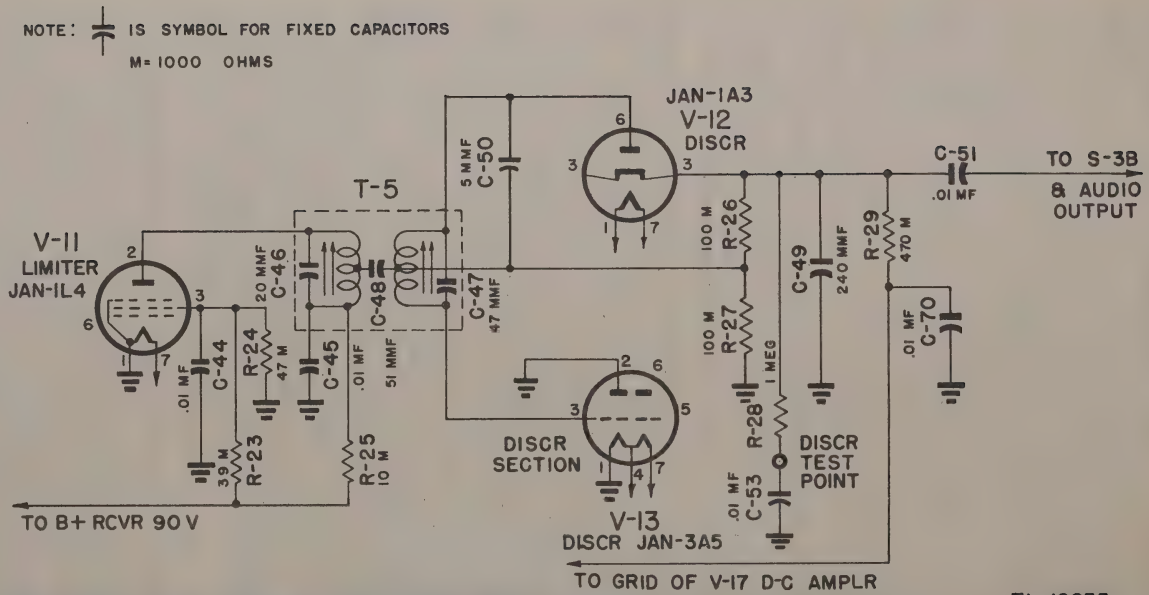
b. The grid of limiter Tube JAN-1L4 (V-11) is fed a comparatively high voltage (1 to 20 volts) from second i-f amplifier V-10. This voltage produces rectified grid current in V-11 which flows through resistor R-22 and biases V-11. The biasing voltage varies with the signal input and acts to prevent the output of V-11 from increasing when the input voltage rises. The voltage divider circuit, consisting of R-23 and R-24 is used to supply a substantially constant screen voltage to V-11, regardless of the bias voltage across resistor R-22. Capacitor C-44 is the r-f bypass on the screen of V-11. The plate circuit of V-11 is fed through r-f filter R-25 and C-45, and through the primary of discriminator transformer T-5. The double-section filter network (R-21, C-43, R-35, and C-55) connects the voltage built up across R-22 to terminal 5-A on jack assembly J-4. The voltage appearing at terminal 5-A is an indication of the signal strength appearing at the antenna, and is used in alignment and presetting procedures. The output of limiter tube V-11 is fed into the discriminator circuit composed of Tube JAN-1A3 (V-12) and Tube JAN-3A5 (V-13). Although T-5 improves the selectivity of the i-f system slightly, it is designed for an entirely different function which is described in paragraph 67.

67. DISCRIMINATOR.

a. The discriminator stage (fig. 26) consisting of Tube JAN-1A3 (V-12) and the diode-connected section of Tube JAN-3A5 (V-13) converts frequency variations of the signal into amplitude variations. An f-m signal of constant amplitude is presented to the discriminator circuit from the second limiter. Discriminator action changes the frequency variations to amplitude variations which are proportional to the change in frequency of the incoming signal. (A signal which shifts $\pm$ 50 kc from the resting frequency produces a greater amplitude audio signal than one shift-

ing only ± 20 kc.) In addition to the audio output, another output is taken from the discriminator to operate the a-f-c circuit. In transformer T-5 a combination of inductive and capacitive coupling is used to produce the action described above. Examination of the circuit diagram (fig. 26) will show that the r-f voltage applied between the plate and cathode of Tube JAN-1A3 (V-12) is composed of the voltage appearing across the primary of T-5 plus the voltage appearing across the **upper** half of the secondary of T-5, in series. (Note that capacitor C-49 keeps the cathode of V-12 at ground r-f potential.) Similarly the voltage appearing across discriminator diode Tube JAN-3A5 (V-13) is composed of the voltage appearing across the primary of T-5 and the voltage across the **lower** half of the secondary of T-5, in series. This secondary voltage is 90° out of phase with the primary voltage when the i-f amplifier is supplying the resting frequency of 4.3 mc. The discriminator action results from the shifting phase of the voltage which appears across the secondary of T-5 with respect to the primary. This shift is rapid at frequencies near 4.3 mc. At exact resonance the r-f voltages appearing across both the upper and lower halves of the secondary of T-5 will be equal and the same amount out of phase with the primary voltage (90°). The r-f voltage rectified by V-12 appears as d-c voltage across resistor R-26, and that rectified by V-13 appears as d-c voltage across resistor R-27. Because of the circuit connections, these voltages at resonance will be opposite in polarity and will cancel each other producing zero voltage to ground at the cathode of V-12. Slight deviation from the resonant or resting frequency will shift the phase of voltages appearing across the top and bottom portions of the secondary of T-5, and the voltage across one half will be more out of phase than the other. The half shifting into phase with the primary will automatically develop a greater voltage, and the half shifting out of phase will produce less voltage across its respective diode and load resistor. This results in either a positive or negative voltage appearing at the cathode of V-12. A similar frequency shift in the opposite direction will produce the opposite voltage at the cathode of V-12. Thus frequency variations impressed on the discriminator from the i-f system produce positive and negative voltages at the cathode of V-12. The frequency of alternation is determined by the frequency with which the signal goes above and below resonance. That is, the audio rate of frequency modulation appears as audio voltage at the cathode of V-12.

b. The primary of T-5 is connected as described in paragraph 66. Capacitor C-48 couples a tap on the primary of T-5 to the cen-



REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-23	39,000 Ω	1/2 W	C-44	.01 MF	120 V
R-24	47,000 Ω	1/2 W	C-45	.01 MF	120 V
R-25	10,000 Ω	1/2 W	C-46	20 MMF	500 V
R-26	100,000 Ω	1/2 W	C-47	47 MMF	500 V
R-27	100,000 Ω	1/2 W	C-48	51 MMF	500 V
R-28	1 MEG Ω	1/2 W	C-49	240 MMF	500 V
R-29	470,000 Ω	1/2 W	C-50	5 MMF	500 V
			C-51	.01 MF	120 V
			C-53	.01 MF	120 V
			C-70	.01 MF	120 V

Figure 26. Receiver-Transmitter BC-1335, receiver discriminator.

ter tap on the secondary of T-5. The primary of T-5 is tuned with fixed capacitor C-46 and an adjustable powdered iron core. The secondary of T-5 is tuned with fixed capacitor C-47 and also with an adjustable powdered iron core. Capacitor C-50 is connected from the center tap of T-5 secondary to the plate lead to discriminator V-12. This capacitor corrects the unbalancing effect of high input capacitance of discriminator diode V-13 to ground. Resistor R-26 is the load for current passing through V-12, and resistor R-27 is the load for current passing through V-13. Resistor R-28 and capacitor C-53 make up an r-f filter for the discriminator test point terminal, located on a terminal board on the side of the receiver chassis. This test point is used in alignment of the discriminator and in testing and servicing the equipment. Capacitor C-49 bypasses the cathode of V-12.

68. AUDIO AMPLIFIER.

a. The audio voltage appearing at the cathode of discriminator tube V-12 is coupled through capacitor C-51 (fig. 27) and OPERATE-ALIGN switch S-3B into the volume control circuit, and from there to the grid of the audio half of V-13. The plate of the audio half of V-13 is coupled through output transformer T-6 into the headphone jacks. Capacitor C-72 is an a-f (audio-frequency) bypass on the primary of output transformer T-6. Two secondary impedances are available on T-6. The equipment is normally supplied with the headset circuit connected to the 4,000-ohm tap. However, by changing one soldered connection under the chassis, the equipment may be converted for operation with 250-ohm headsets. Jacks J-3B and J-3C are connected to the output of T-6, and one or two headsets may be used. When two headsets are used, no impedance-matching correction is made.

b. During the presetting procedure the audio circuit is used as a d-c amplifier for eye tube V-18. This operation is obtained by throwing switch S-3 to the ALIGN position. This connects 6 volts to the filament of V-18, places R-51 in series with the plate of the audio amplifier and disconnects the VOLUME control from the discriminator circuit. Under this condition any negative voltages applied to the test prod are impressed on VOLUME control R-31 and a portion (depending on the VOLUME control setting) applied to the grid of audio tube V-13. Variations in this grid voltage produce correspondingly greater voltage variation on the plate of audio tube V-13; this voltage is impressed on the control electrodes of eye tube V-18. Variations of this voltage cause the eye tube to open and close. Thus the test prod may be plugged into any point on test strip J-4, and circuits may be tuned by not-

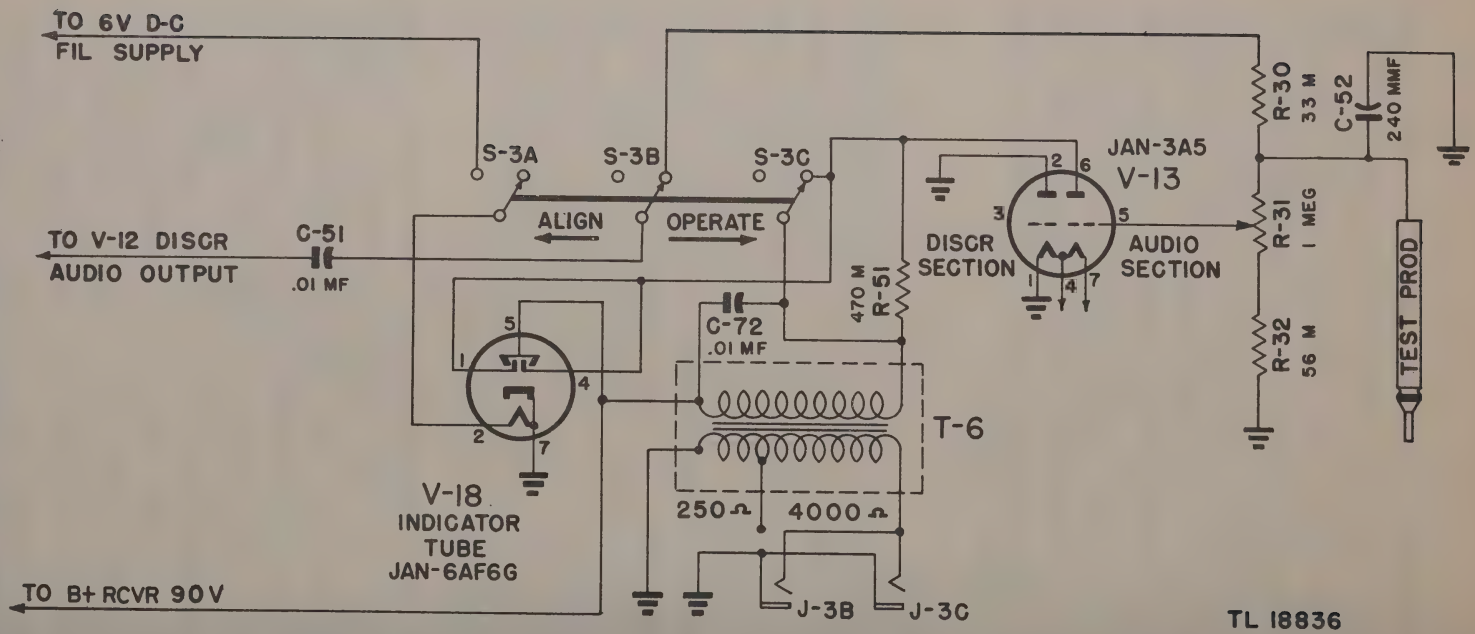


Figure 27. Receiver-Transmitter BC-1335, receiver audio amplifier and test circuit.

REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-30	33,000 Ω	1/2 W	C-51	.01 MF	120 V
R-31	1 MEG	VOLUME	C-52	240 MMF	500 V
R-32	56,000 Ω	1/2 W	C-72	.01 MF	120 V
R-51	470,000 Ω	1/2 W			

NOTE: ⊣⊢ IS SYMBOL FOR FIXED CAPACITORS

M = 1000 OHMS

ing the voltages appearing at these points by means of eye tube V-18. Sensitivity of the eye tube is adjusted with the VOLUME control.

c. Capacitor C-51 is a d-c blocking coupling capacitor. The audio voltage passes through switch S-3B into the r-f filter consisting of resistor R-30 and capacitor C-52, which in turn connects the audio voltage to VOLUME control R-31. Resistor R-32 is connected in the ground end of R-31, so it is not possible to turn the volume completely down to zero. The arm on VOLUME control R-31 connects directly to the grid of the audio section of V-13. The plate voltage of 90 volts is connected through the primary of output transformer T-6 into the plate of the audio section of V-13. Capacitor C-72 is connected across the primary of T-6 to reduce the high-frequency response of the audio system. Note that with switch S-3C in the OPERATE position, resistor R-51 is short-circuited. One end of the secondary of T-6 is permanently grounded to the chassis. Two taps on the secondary are available: one for use with 4,000-ohm headphones, and the other for use with 250-ohm headphones. A soldering iron is required to change this connection.

d. With switch S-3 in the ALIGN position only the test prod is connected to VOLUME control R-31. The plate of the audio section of tube V-13 is connected through the primary of T-6 and R-51, in series. With S-3 in ALIGN, S-3A connects the heater circuit of eye Tube JAN-6AF6G (V-18) to the battery supply voltage at VOLUME control switch S-4 through resistor R-55 (fig. 61). Switch S-5B short circuits this resistor for 6-volt operation. For 12-volt operation R-55 drops the heater voltage of V-18 to 6.3 volts. The target plate of eye tube V-18 is connected to the 90-volt plate supply. The director plates of V-18 are connected to the plate of the audio half of V-13. The voltage impressed on the grid of audio tube V-13 may be controlled by the setting of VOLUME control R-31, and thus the sensitivity of eye tube V-18 is adjusted by R-31.

69. TRANSMITTER CIRCUIT.

The transmitter (fig. 28) consists of push-pull self-excited oscillator V-4 kept exactly on channel frequency with reactance tube V-5 locked into the receiver by a control network. The channel frequency is controlled through this a-f-c network by the crystal-controlled receiver. The output of this oscillator is fed through push-push frequency-doubler V-3 into the push-pull neutralized final p-a V-1 and V-2. The output of this amplifier is coupled into the antenna through L-2 or L-1, and C-2.

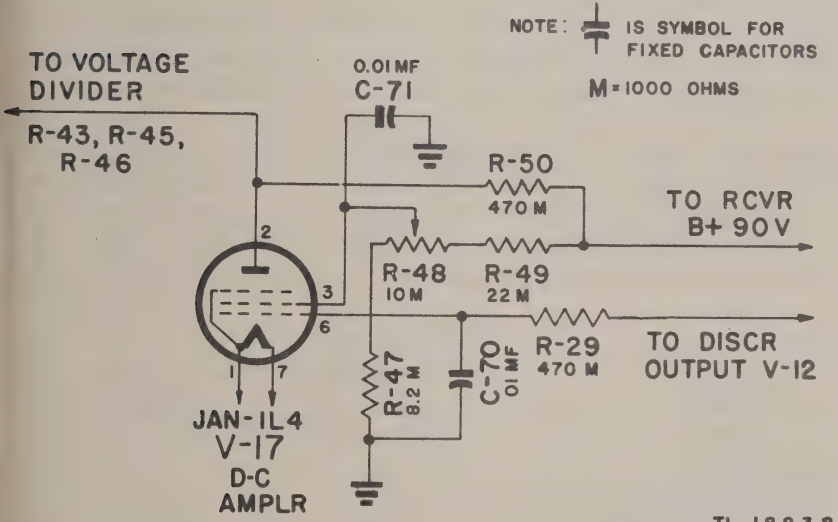
REF SYM	VALUE	RATING
R-1	39	2 W
R-2	33	2 W
R-3	4,700	2 W
R-4	39,000	2 W
R-5	10,000	2 W
R-6	3,300	2 W
R-7	6,800	2 W
R-8	4,700	2 W
R-9	27,000	2 W
R-10	330,000	2 W
R-11	470,000	2 W
R-12	470,000	2 W
R-34	1 MEG	2 W
R-42	220,000	2 W
R-43	1 MEG	2 W
R-44	220,000	2 W
R-45	120,000	2 W
R-46	1 MEG	2 W
R-47	1 MEG	2 W
R-48	10,000	2 W
R-49	22,000	2 W
R-50	470,000	2 W

REF SYM	VALUE	RATING
C-1	2.5 TO 13 MMF	500 V
C-2	240 MMF	500 V
C-3	100 MMF	500 V
C-4	3.7 TO 25 MMF	500 V
C-5	3.7 TO 25 MMF	500 V
C-6	4.5 TO 25 MMF	500 V
C-7	4.5 TO 25 MMF	500 V
C-8	27 MMF	500 V
C-9	27 MMF	500 V
C-10	240 MMF	500 V
C-11	240 MMF	500 V
C-12	4.5 TO 25 MMF	500 V
C-13	240 MMF	500 V
C-14	47 MMF	500 V
C-15	47 MMF	500 V
C-16	24 MMF	500 V
C-17	24 MMF	500 V
C-18	240 MMF	500 V
C-19	51 MMF	500 V
C-20	15 MMF	500 V
C-21	510 MMF	500 V
C-22	.01 MF	1,200 V
C-23	15 MF	150 V
C-24	40 MF	250 W
C-65	240 MMF	500 V
C-66	.01 MF	1,200 V
C-67	.01 MF	1,200 V
C-68	.01 MF	1,200 V
C-69	.01 MF	1,200 V
C-70	.01 MF	1,200 V
C-71	.01 MF	1,200 V

Figure 28. Receiver-Transmitter BC-1335, transmitter.

70. DIRECT-CURRENT AMPLIFIER.

a. The transmitter frequency is controlled through the receiver circuit so that the average discriminator voltage will remain at zero. Any variation from zero voltage at the cathode of V-12 is amplified through d-c amplifier Tube JAN-1L4 (V-17) and impressed on the control grid of the reactance tube V-5 in the transmitter, which corrects the transmitter frequency until the discriminator voltage is again zero. An a-f filter is provided between the discriminator and the control grid of the d-c amplifier so that when the transmitter is frequency-modulated, the a-f-c circuit will not neutralize this modulation by automatic compensation. This consists of resistor R-29 and capacitor C-70 (fig. 29). The plate of the d-c amplifier is fed from receiver B+ (90 volts) through resistor R-50. The operating plate voltage of this tube is about 45 volts. The screen of V-17 is fed through an adjustable bleeder circuit consisting of resistor R-48, in series with R-47 and R-49. Resistor R-48 is a potentiometer used to set the operating plate voltage at exactly the right value to compensate for slight manufacturing tolerances necessary in the a-f-c circuit constants.



REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-47	8,200 Ω	1/2 W	C-70	.01 MF	120 V
R-48	10,000 Ω	1/2 W	C-71	.01 MF	120 V
R-49	22,000 Ω	1/2 W			
R-50	470,000 Ω	1/2 W			
R-29	470,000 Ω	1/2 W			

Figure 29. Receiver-Transmitter BC-1335, d-c amplifier in a-f-c circuit.

The gain in this tube is approximately 40; that is, the plate voltage variation is approximately 40 times the variation in voltage impresed on the control grid.

b. Resistor R-29 and capacitor C-70 are a-f and r-f filters for the control grid of V-17. Resistors R-47, R-48, and R-49 are in series from receiver B+ to ground; they supply adjustable voltage to the screen grid of V-17. This screen grid is bypassed for radio frequency with C-71. The plate load resistor of V-17 is R-50.

71. BIAS OSCILLATOR.

a. The bias oscillator circuit (fig. 30) consisting of Tube JAN-1R5 (V-16), coil L-28 and various coupling and tuning capacitors, is provided only to supply a negative source of voltage during transmission time. The ocillator tank circuit consists of coil L-28 and capacitor C-66. The injector and control grids are separately coupled to this tank circuit. This tube is operated only when the press-to-talk switch is depressed, thus applying filament voltage to the transmitting tubes. With tube V-16 inoperative, a positive voltage is impressed on the control grid of V-16 through the resistor string R-43, R-45, and R-46 from the plate of d-c amplifier V-17. The separate grid coupling capacitors are provided to isolate this voltage from the injector grid of V-16 and so insure that oscillation will start when the press-to-talk switch is depressed.

REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-41	3,300 ~	1/2 W	C-66	240 MMF	500 V
R-42	220,000 ~	1/2 W	C-67	.01 MF	120 V
R-44	220,000 ~	1/2 W	C-68	.01 MF	120 V
			C-69	.01 MF	120 V

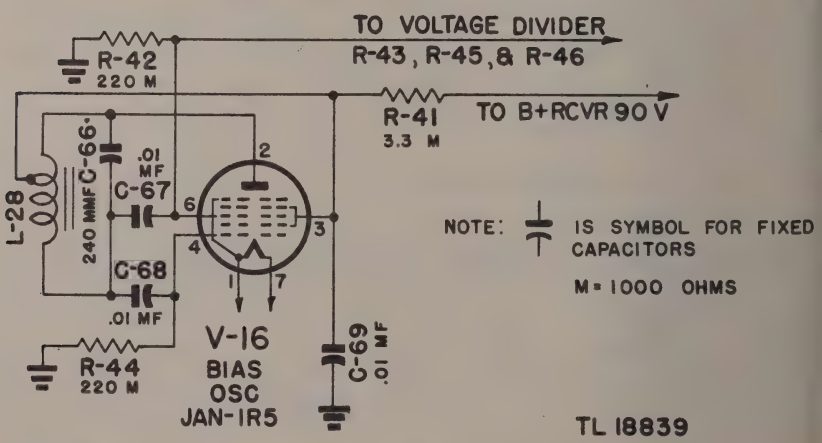


Figure 30. Receiver-Transmitter BC-1335, transmitter bias oscillator.

b. Coil L-28 is the tank circuit inductance of the bias oscillator and is tuned by capacitor C-66 to an indefinite frequency. The injector grid is coupled from one end of L-28 through capacitor C-68 and resistor R-44. The control grid is coupled from the same end through capacitor C-67 and resistor R-42. The plate of V-16 is connected to the opposite end of L-28, and a tap on L-28, approximately one-third of the way from the plate end, is coupled to the 90-volt receiver plate supply through resistor R-41 and is bypassed to ground by capacitor C-69. The screen of V-16 is fed from this same point. Approximately 45 volts negative potential appears between R-42 and R-43 because of the oscillation of this tube.

72. REACTANCE TUBE CIRCUIT.

a. Reactance Tube JAN-3Q4 (V-5) is connected across the transmitter oscillator circuit in such a way that it acts as a capacitor, the size of which depends on the mutual conductance of reactance tube V-5 which in turn is controlled by the bias voltage applied to the control grid (fig. 31). This tube serves two functions: it modulates the frequency of the transmitter oscillator at an audio rate, and it maintains the transmitter oscillator exactly on channel frequency through a control circuit coupled to the receiver discriminator. Its action depends on driving the control grid with r-f voltage 90° out of phase with the r-f voltage impressed on the plate. The plate current of this tube is then 90° out of phase with the plate voltage. The action of the tube thus satisfies requirements of the operation of a capacitor. Varying the d-c bias on the control grid varies the mutual conductance of the tube and thus the amount of r-f plate current; because of this the apparent size of the input capacitance from plate to ground on tube V-5 may be varied by changing the bias on the control grid. Audio modulation is applied to this control grid from microphone transformer T-1, through a resistance-capacitance network, for frequency modulation of the transmitter oscillator. The average bias on V-5 is determined by the control network consisting of tubes V-16 and V-17 which operates from the discriminator voltage on the cathode of V-12. This network maintains the transmitter oscillator on the proper frequency.

b. The plate of reactance Tube JAN-3Q4 (V-5) is coupled through resistor R-6 and capacitor C-18 to one side of push-pull transmitter oscillator Tube JAN-3A5 (V-4). Resistor R-6 limits the plate current in V-5. The control grid is coupled to the other side of the transmitter oscillator circuit through phase shifting network C-19, R-7, and C-20. D-c and a-f voltages are applied to

REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-6	3,300 Ω	1/2 W	C-12	4.5 TO 25 MMF	500 V
R-7	6,800 Ω	1/2 W	C-14	36 MMF	500 V
R-8	4,700 Ω	1/2 W	C-15	47 MMF	500 V
R-9	27,000 Ω	1/2 W	C-18	240 MMF	500 V
R-10	330 Ω	1/2 W	C-19	51 MMF	500 V
R-11	220,000 Ω	1/2 W	C-20	15 MMF	500 V
R-12	470,000 Ω	1/2 W	C-21	510 MMF	500 V
			C-22	.01 MF	120 V
			C-23	.13 MF	100 V
			C-24	40 MF	25 V

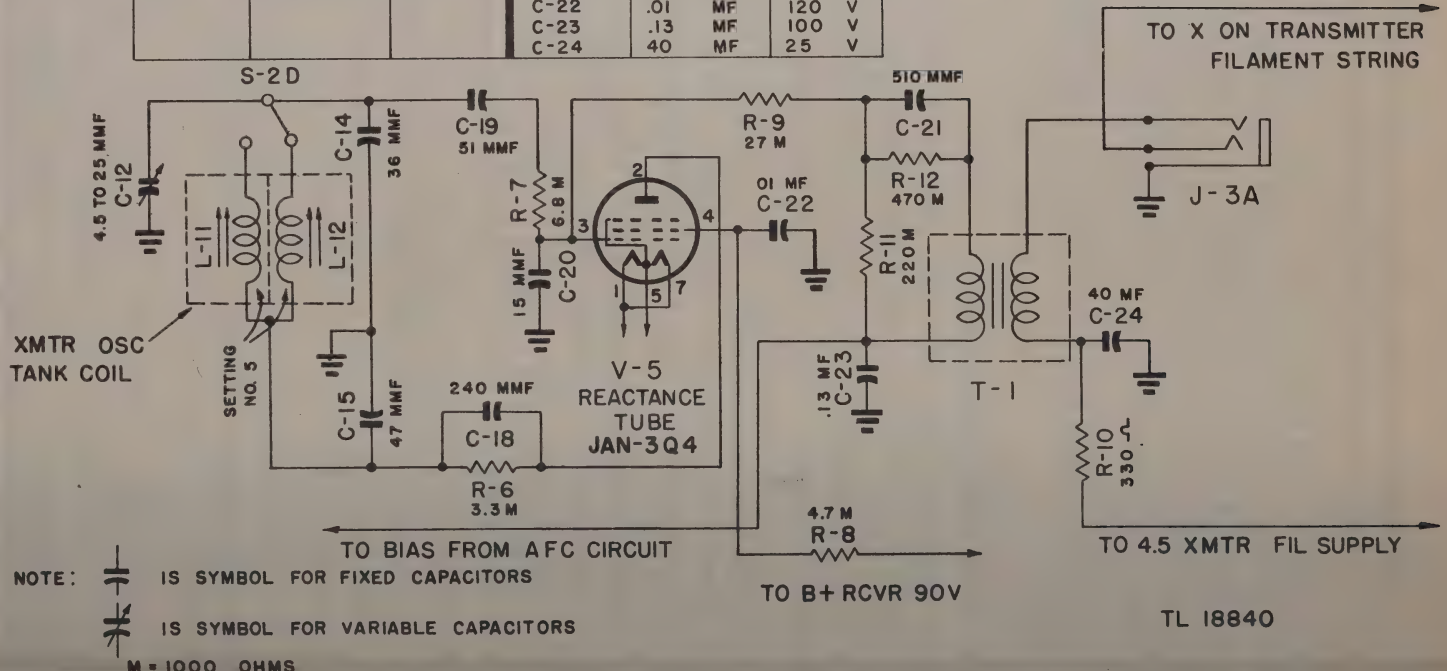


Figure 31. Receiver-Transmitter BC-1335, transmitter reactance modulator.

the control grid of V-5 through r-f isolating resistor R-9. The screen of V-5 is supplied through r-f filter R-8, C-22. Modulation a-f voltages are coupled into reactance tube isolating resistor R-9 through the network consisting of R-11, R-12, and C-21. Resistor R-12 and capacitor C-21 are so chosen that the voltage appearing across R-11 increases as the audio frequency supplied by T-1 increases. This gives preemphasis on the higher frequencies. The microphone which is coupled through jack J-3A is connected between one end of the primary of microphone transformer T-1 and ground. Direct current through the carbon-button microphone is supplied through resistor R-10 from the circuit filament voltage supply, and C-24 is an a-f bypass on the lower end of T-1 primary. Capacitor C-23 is an a-f bypass on the ground side of the secondary of T-1.

73. TRANSMITTER OSCILLATOR.

a. The transmiter oscillator (fig. 32) operates at one-half the transmitter output frequency. It consists of Tube JAN-3A5 (V-4) with tank circuit C-14, C-15, and L-11 or L-12 connected in a push-pull circuit. Capacitor C-12 is used in the alignment procedure for accurately calibrating the presetting counters on SETTING NO. 5. The output of the oscillator is coupled into doubler Tube JAN-3A5 (V-3).

REF SYM	VALUE	RATING
R-5	10,000 Ω	1/2 W

REF SYM	VALUE	RATING
C-11	240 MMF	500 V
C-12	4.5 TO 25 MMF	500 V
C-13	240 MMF	500 V
C-14	36 MMF	500 V
C-15	47 MMF	500 V
C-16	24 MMF	500 V
C-17	24 MMF	500 V

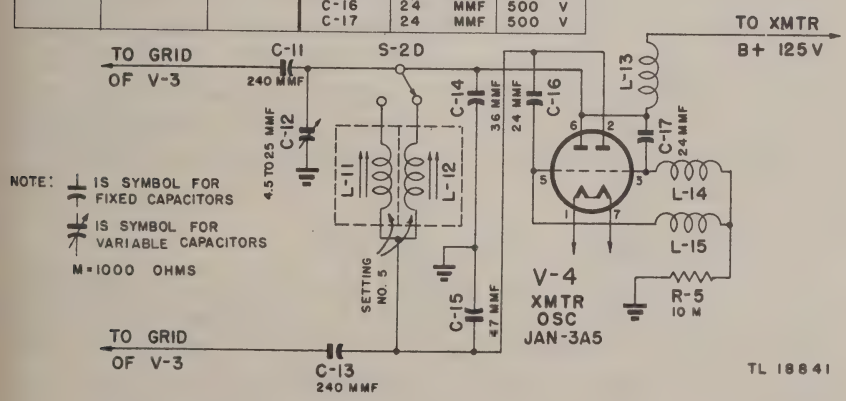


Figure 32. Receiver-Transmitter BC-1335, transmitter oscillator.

b. The transmitter oscillator plate supply voltage is fed to the plates through r-f choke L-13. The grids of V-4 are coupled to the opposite plates through C-16 and C-17. Grid bias is provide across resistor R-5 through r-f chokes L-14 and L-15. Capacitors C-14, C-15, and C-12 are special capacitors with accurately adjusted negative temperature coefficient to minimize drift in the oscillator circuit with temperature. This minimizes the amount of correction necessary through control circuit Tubes JAN-1R5 (V-16) and JAN-1L4 (V-17) and reactance Tube JAN-3Q4 (V-5).

74. TRANSMITTER DOUBLER CIRCUIT.

a. Transmitter doubler Tube JAN-3A5 (V-3) is connected in a push-push arrangement (fig. 33). The grids are fed from transmitter oscillator Tube JAN-3A5 (V-4) 180° out of phase. The plates are connected in parallel, and feed the tank circuit consisting of C-8, C-9, and L-6 or L-7 (fig. 34), which is tuned to the second harmonic of the input frequency. Bias is obtained through a center tap on L-6 and L-7 so that the output may be fed into the push-pull power amplifier by exciting the grids of the p-a tubes which are also 180° out of phase.

b. Capacitors C-11 and C-13 (fig. 32) couple the transmitter oscillator output into the two grids of V-3 (double triode). Bias voltage due to rectified grid current for both grids appears across resistor R-4 and is connected to the grids through r-f chokes L-9 and L-10 (fig. 33). Plate voltage on V-3 is fed from the transmitter plate supply (125 volts) through r-f choke L-8. The output of the doubler tube is connected through capacitor C-10 to one side of tank coil L-6 or L-7. Capacitors C-8 and C-9 are connected in series across this coil with the center tap of the capacitors grounded. The grids of the push-pull amplifier are coupled from opposite ends of L-6 or L-7 and the rectified grid current bias voltage developed on the p-a grids appears across R-3. R-f choke L-5 isolates the d-c grid bias from r-f voltages appearing at the center tap of L-6 or L-7. The d-c voltage is used in presetting and is brought out to terminal 6 on jack J-4 through r-f filter R-34 and C-54 (fig. 61).

75. RADIO-FREQUENCY POWER AMPLIFIER.

a. The r-f power amplifier consists of two Tubes JAN-3A5 (V-1 and V-2) connected in push-pull (fig. 34). The grids and plates of double triodes V-1 and V-2 are connected in parallel. Since the output of this stage is on the same frequency as the input it is necessary to neutralize this stage with capacitors C-6 and C-7 to prevent self-oscillation. The output of this stage is fed into tank coil L-4 which is tuned with variable air trimmer C-4 or C-5. Cou-

Figure 33. Receiver-Transmitter BC-1335, transmitter doubler.

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pling from L-4 into the antenna system is effected in the manner discussed in paragraph 59.

b. The grids of p-a Tubes JAN-3A5 (V-1 and V-2) are connected directly to the output of doubler tube V-3. This output appears across coil L-6 or L-7. Capacitors C-6 and C-7 are connected from the grid of one tube to the plate of the opposite tube for neutralization. Capacitors C-4 and C-5 are air trimmers which are alternately connected to tank coil L-4 by CHANNEL switch S-2A. Plate voltage on the p-a tubes is connected to the center tap of tank coil L-4 through r-f choke L-3. Capacitor C-2 bypasses the B+ end of L-3 to prevent r-f voltages from appearing on the transmitter B+ connection. Switch S-1A is opened during the alignment and presetting procedure on SETTING NO. 5 and SETTING NO. 6. This removes plate voltage from the power amplifier and thus prevents damage to the tubes due to excess plate current which might result if the final tank circuit were off resonance. Plate current for this stage is drawn through the dial lamp in jack J-1. The brilliance of this lamp is an indication of the plate current drawn in the r-f p-a circuit. Resistor R-1 is connected across this lamp to reduce the maximum brilliance and to prevent the lamp from burning out. R-1 supplies plate voltage to the final amplifier if the lamp burns out.

76. POWER SUPPLY.

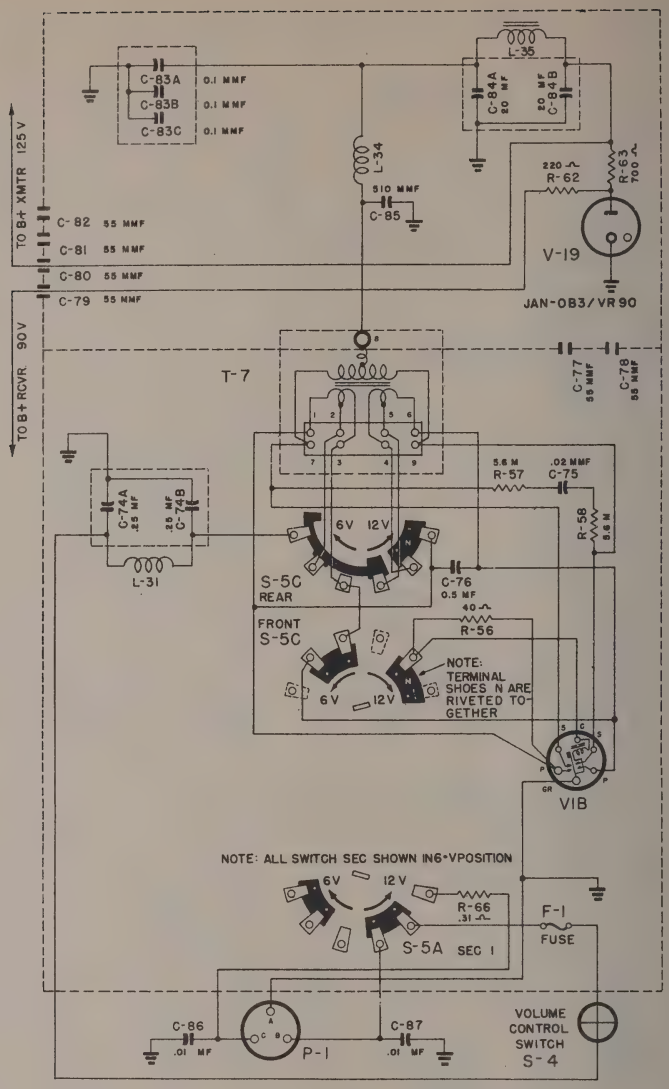
a. The power supply of Receiver-Transmitter BC-1335 does not use tubes. The supply voltage of 6 or 12 volts appears across plug P-1 between A and B, or A and C, respectively (fig. 35). The equipment is designed **only** for **negative ground** in the supply battery. Pin A on P-1 is always at negative potential. Switch S-5A selects the proper voltage from this plug and connects it through fuse F-1 and VOLUME control switch S-4 into the power supply proper. The lead from switch S-4 connects to the filament circuit which is described in paragraph 77. It also connects to the high-voltage supply circuit which makes use of transformer T-7 and a synchronous vibrator VIB to convert the direct current into alternating current, increase the voltage, and rectify the output. This pulsating d-c output is filtered for r-f hash and for vibrator frequency hum before being supplied to the receiver-transmitter unit. Switch S-5, sections A, B, and C, are used to convert the equipment from 6-volt to 12-volt supply voltages. Transformer T-7 is supplied with two primaries. Switch S-5C connects them in series for 12-volt operation and in parallel for 6-volt operation. Buffer capacitors C-76 and C-75 are supplied on primary and secondary windings of the transformer to reduce vibrator arcing. The d-c supply to the vibrator is filtered with the hash filter, con-

REF SYM	VALUE	RATING
R-1	82 Ω	1/2 W
R-2	39 Ω	1/2 W
R-3	4,700 Ω	1/2 W
R-34	1 MEG Ω	

REF SYM	VALUE	RATING
C-1	2.5TO13 MMF	500 V
C-2	240 MMF	500 V
C-3	100 MMF	500 V
C-4	3.7TO35.2 MMF	500 V
C-5	3.7TO35.2 MMF	500 V
C-6	4.5TO25 MMF	500 V
C-7	4.5TO25 MMF	500 V
C-8	27 MMF	500 V
C-9	27 MMF	500 V
C-54	240 MMF	500 V

NOTE: ⊣⊢ IS SYMBOL FOR FIXED CAPACITORS
⊣⊢ IS SYMBOL FOR VARIABLE CAPACITORS
M = 1000 OHMS

Figure 34. Receiver-Transmitter BC-1335, transmitter push-pull power amplifier.



REF SYM	VALUE	RATING
R-56	40 Ω	3 W
R-57	5,600 Ω	1 W
R-58	5,600 Ω	1 W
R-62	220 Ω	1 W
R-63	700 Ω	10 W
R-66	.31 Ω	7 W
C-74A	2.5 MF	400 V
C-74B	2.5 MF	400 V
C-75	.02 MF	1500 V
C-76	.5 MF	400 V
C-77	55 MMF	1000 V

REF SYM	VALUE	RATING
C-78	55 MMF	1000 V
C-79	55 MMF	1000 V
C-80	55 MMF	1000 V
C-81	55 MMF	1000 V
C-82	55 MMF	1000 V
C-83A	0.1 MF	400 V
C-83B	0.1 MF	400 V
C-83C	0.1 MF	400 V
C-84A	20 MF	400 V
C-84B	20 MF	400 V
C-85	510 MMF	500 V
C-86	.01 MF	120 V
C-87	.01 MF	120 V

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Figure 35. Receiver-Transmitter BC-1335, high-voltage supply.

sisting of r-f choke L-31 and capacitors C-74A and C-74B. The wiring on this part of the equipment is inclosed in a well-shielded compartment to prevent radiation of interference from the vibrator circuits into the rest of the radio.

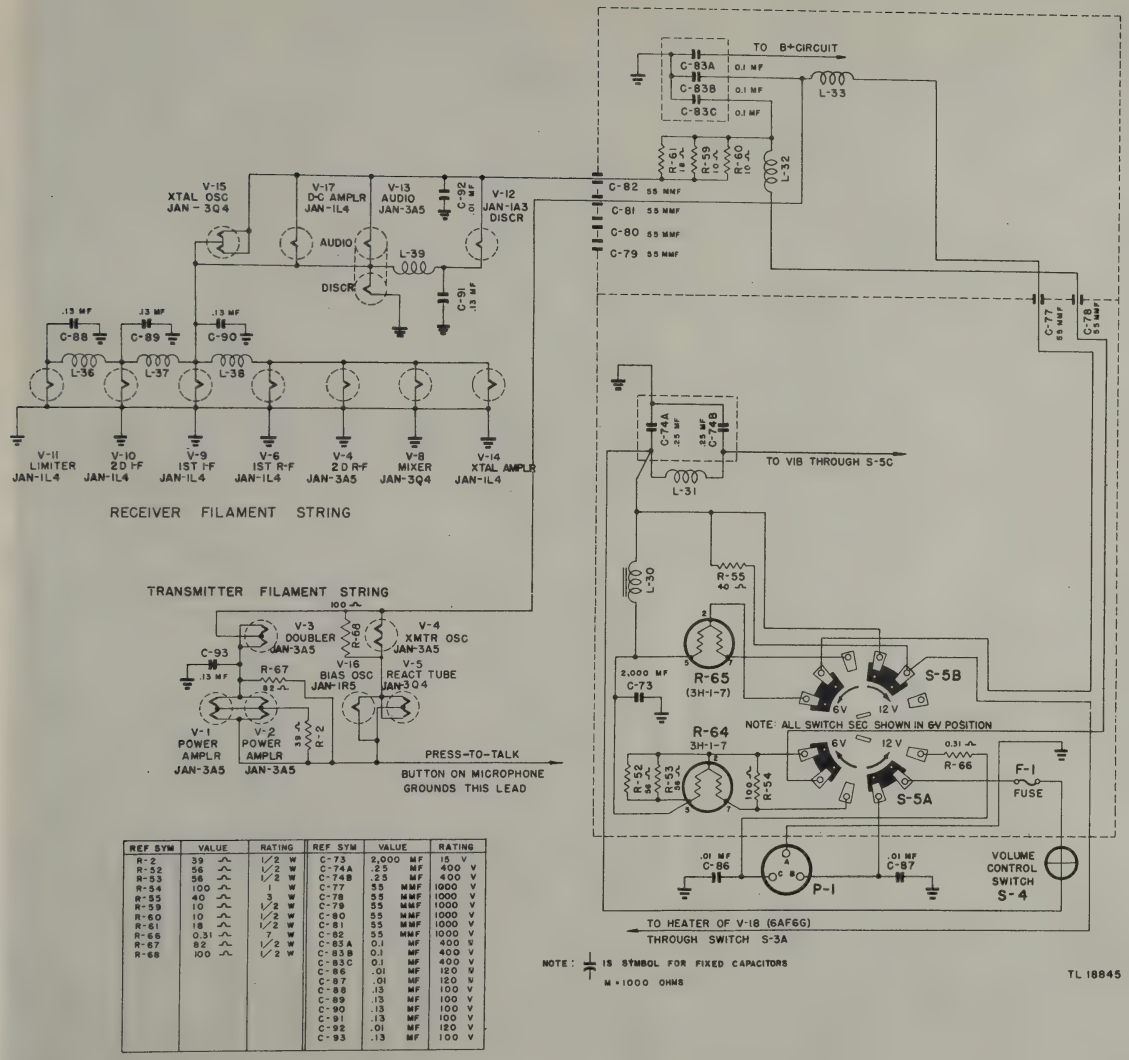
b. When 6 volts are supplied to the equipment at plug P-1 and switch S-5A is in the 6-volt position, the positive voltage appears at fuse F-1 and the negative at terminal A. When 12 volts are supplied and switch S-5A is in the 12-volt position, the positive voltage appears again at F-1, and the negative voltage at A. Resistor R-66 in the positive side of the 12-volt line prevents excessive current drain when the equipment is started with a 12-volt supply, and so reduces arcing at the vibrator contacts. C-86 and C-87 are bypass capacitors used to reduce interference radiated from the leads to C and B on plug P-1. These leads enter the power supply circuit through the shielded compartment. Fuse F-1 is a 10-amp fuse replaceable from the top of the chassis. Switch S-4 is the on-off switch on the VOLUME control and is operated during the first 20° rotation of the VOLUME control. C-74A and C-74B make up a double bypass capacitor, which together with choke L-31 helps prevent interference from being conducted out of the vibrator circuits into the rest of the radio. R-56 is connected in series with the coil on vibrator VIB and is short-circuited with switch S-5C in the 6-volt position. One primary of T-7 is connected between 1 and 3 with the center tap connected to 2. The other primary is connected between 4 and 6 with the center tap connected to 5. Switch S-5C connects the d-c supply lead from L-31 to terminals 2 and 5, which are connected together for 6-volt operation, or to terminals 3 and 4 which are connected together for 12-volt operation. This switch also connects terminals 1 and 4, and 3 and 6 in parallel for 6-volt operation, thus connecting the primaries in parallel. Terminals 7 and 9 on T-7 are connected to the secondary winding and are permanently connected to the secondary contacts on the vibrator. R-58, C-75 and R-57 constitute the secondary buffer circuit for T-7. C-76 is the primary buffer for T-7. Rectified positive voltage appears at the center tap of T-7 and is connected through the r-f filter consisting of C-85, L-34, and C-83A into the hum filter circuit consisting of L-35, C-84A, and C-84B. The output of the hum filter is connected directly to the transmitter plate supply, bypassed at the shield by r-f bypass capacitor C-80. The receiver plate supply is obtained from this filter through resistor R-63 and across constant voltage Tube JAN-OB3/VR90 (V-19). This tube maintains its plate potential at 103 volts over a wide range of voltage from the hum filter. R-62 reduces this voltage to approximately 90 volts for

use in the receiver plate supply. The lead to the receiver from R-62 is bypassed with capacitors C-79 and C-38 (fig. 61).

77. FILAMENT CIRCUIT.

a. The filament circuits (fig. 36) make use of two voltage regulator resistors R-64 and R-65 mounted in tube envelopes with the number 3H-1-7 stamped on the base. These resistors are connected in series with the transmitter and receiver filament circuits. Switch S-5A and S-5B connect these resistors so that only a portion of the total resistance is in the circuit for 6-volt operation. In 12-volt operation an additional resistance is added to provide 6 volts more drop across the ballast resistors. These ballast resistors automatically regulate the filament voltage on the receiver and transmitter so that the percentage change in filament voltage is smaller than the percentage change in supply voltage. L-30 and C-73 are used to filter any hum voltage appearing at switch S-4 from the filament circuit due to vibrator operation. R-65 is used to control the voltage on the transmitter filament circuit. R-64 is identical to R-65 and is used to control the receiver filament voltage. Resistors R-52, R-53, and R-54 are shunted across R-64 to supply the additional current required by the receiver filament circuit over that required by the transmitter. R-f filters consisting of C-77, C-78, L-32, L-33, C-81, C-82, C-83B, and C-83C are provided in the output of ballast resistors R-64 and R-65 to prevent conduction of interference from the vibrator compartment. The receiver filament circuit requires a voltage of 2.8 volts and the transmitter circuit operates at 4.2 volts. R-59, R-60, and R-61 are connected in parallel in the receiver filament voltage supply to produce the required drop of 1.4 volts. The transmitter filament voltage is applied by the press-to-talk switch on the microphone. This switch grounds one connection of the transmitter filament circuit through the connection on microphone jack J-3A marked X on the schematic (fig. 37). Resistor R-55 supplies filament voltage to eye Tube JAN-6AF6G (V-18) through the OPERATE-ALIGN switch and is short-circuited for 6-volt operation by switch S-5B. For 12-volt operation a voltage drop of 6 volts appears across R-55 if V-18 is in operation.

b. VOLUME control switch S-4 supplies either 6 or 12 volts to choke L-30. L-30 and capacitor C-73 comprise a hum filter circuit. The output of this circuit is connected to ballast resistors R-65 and R-64. Switch S-5A and S-5B connect the filament supply leads to the proper connections on R-64 and R-65 depending upon the supply voltage used. C-77 and C-78 are r-f bypass capacitors and L-32 and L-33 are r-f chokes. C-83B, C-83C, and C-81 and C-82 are bypass capacitors which are connected in the r-f filter



REF SYM	VALUE	RATING
R-2	39 Ω	1/2 W
R-52	56 Ω	1/2 W
R-53	56 Ω	1/2 W
R-54	100 Ω	1 W
R-55	40 Ω	3 W
R-59	10 Ω	1/2 W
R-60	10 Ω	1/2 W
R-61	18 Ω	1/2 W
R-66	0.31 Ω	7 W
R-67	82 Ω	1/2 W
R-68	100 Ω	1/2 W

REF SYM	VALUE	RATING
C-73	2,000 MF	15 V
C-74A	.25 MF	400 V
C-74B	.25 MF	400 V
C-77	55 MMF	1900 V
C-78	55 MMF	1000 V
C-79	55 MMF	1000 V
C-80	55 MMF	1000 V
C-81	55 MMF	1000 V
C-82	55 MMF	1000 V
C-83A	0.1 MF	400 V
C-83B	0.1 MF	400 V
C-83C	0.1 MF	400 V
C-86	.01 MF	120 V
C-87	.01 MF	120 V
C-88	.13 MF	100 V
C-89	.13 MF	100 V
C-90	.13 MF	100 V
C-91	.13 MF	100 V
C-92	.01 MF	120 V
C-93	.13 MF	100 V

Figure 36. Receiver-Transmitter BC-1335, filament circuit supply.

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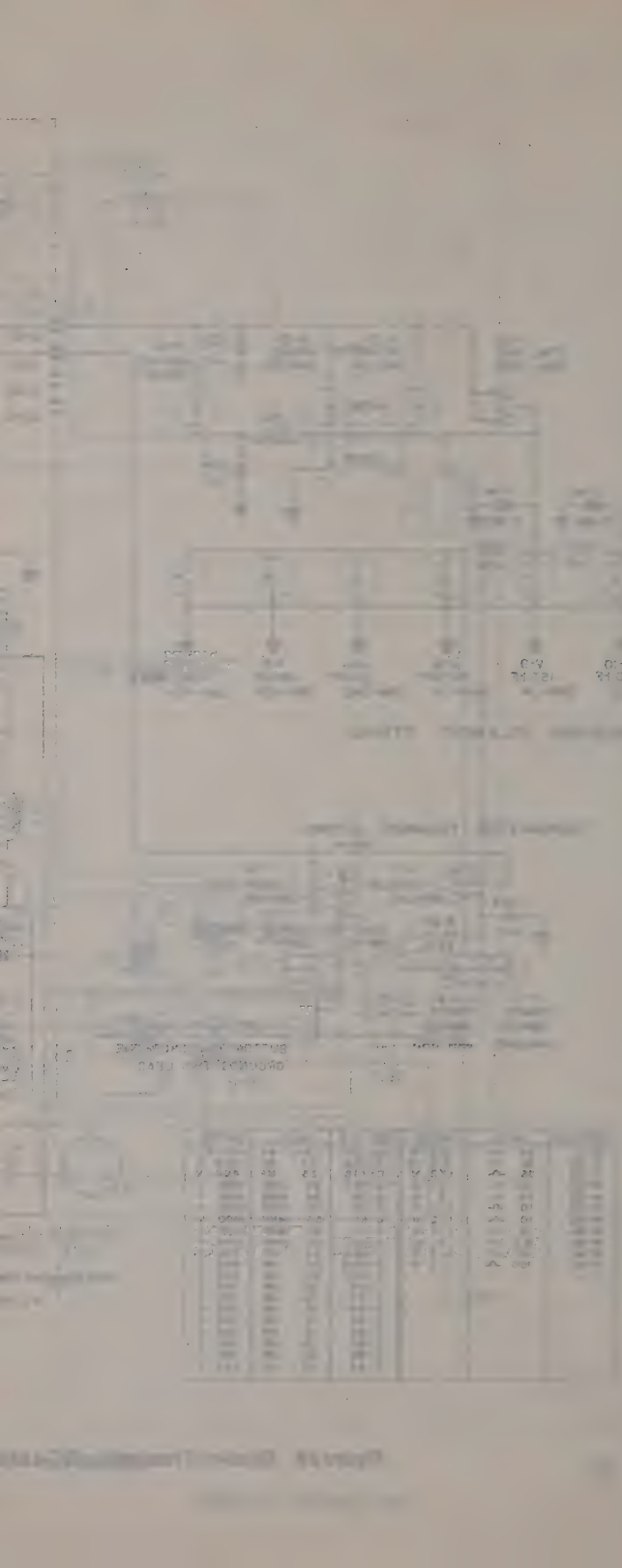
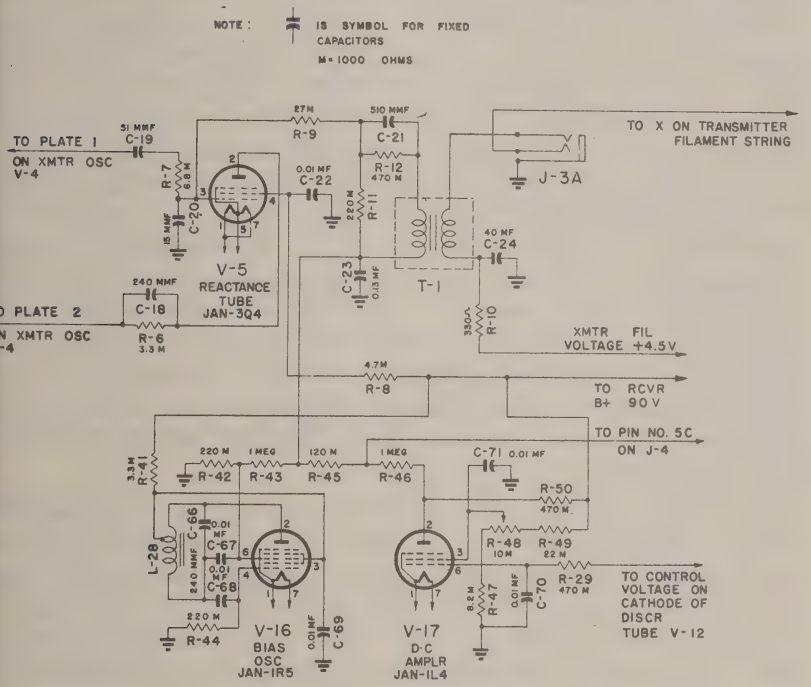


to the filament connections. R-2 and R-67 balance the voltages appearing across the series connected transmitter filament circuits.

78. CONTROL CIRCUIT.

a. The control circuit (fig. 37) is used to maintain the transmitter oscillator on half the transmitter output frequency. Every tube in the equipment except eye tube V-18 and the audio half of V-13 is used for this purpose. With the press-to-talk switch depressed tubes V-1, V-2, V-3, V-4, V-5, and V-16 have filament voltage applied (fig. 36). R-f voltage generated in the oscillator tube is fed into the doubler tube, and from there into the power amplifier. A small portion of the output of the power amplifier is fed



REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
R-6	3,300 Ω	1/2 W	C-18	240 MMF	500 V
R-7	6,800 Ω	1/2 W	C-19	51 MMF	500 V
R-8	4,700 Ω	1/2 W	C-20	15 MMF	500 V
R-9	27,000 Ω	1/2 W	C-22	.01 MF	120 V
R-10	330 Ω	1/2 W	C-23	.13 MF	100 V
R-11	220,000 Ω	1/2 W	C-24	40 MF	25 V
R-12	470,000 Ω	1/2 W	C-66	240 MMF	500 V
R-29	470,000 Ω	1/2 W	C-67	.01 MF	120 V
R-41	3,300 Ω	1/2 W	C-68	.01 MF	120 V
R-42	220,000 Ω	1/2 W	C-69	.01 MF	120 V
R-43	1 MEG	1/2 W	C-70	.01 MF	120 V
R-44	220,000 Ω	1/2 W	C-71	.01 MF	120 V
R-45	120,000 Ω	1/2 W			
R-46	1 MEG	1/2 W			
R-47	8,200 Ω	1/2 W			
R-48	10,000 Ω	1/2 W			
R-49	22,000 Ω	1/2 W			
R-50	470,000 Ω	1/2 W			

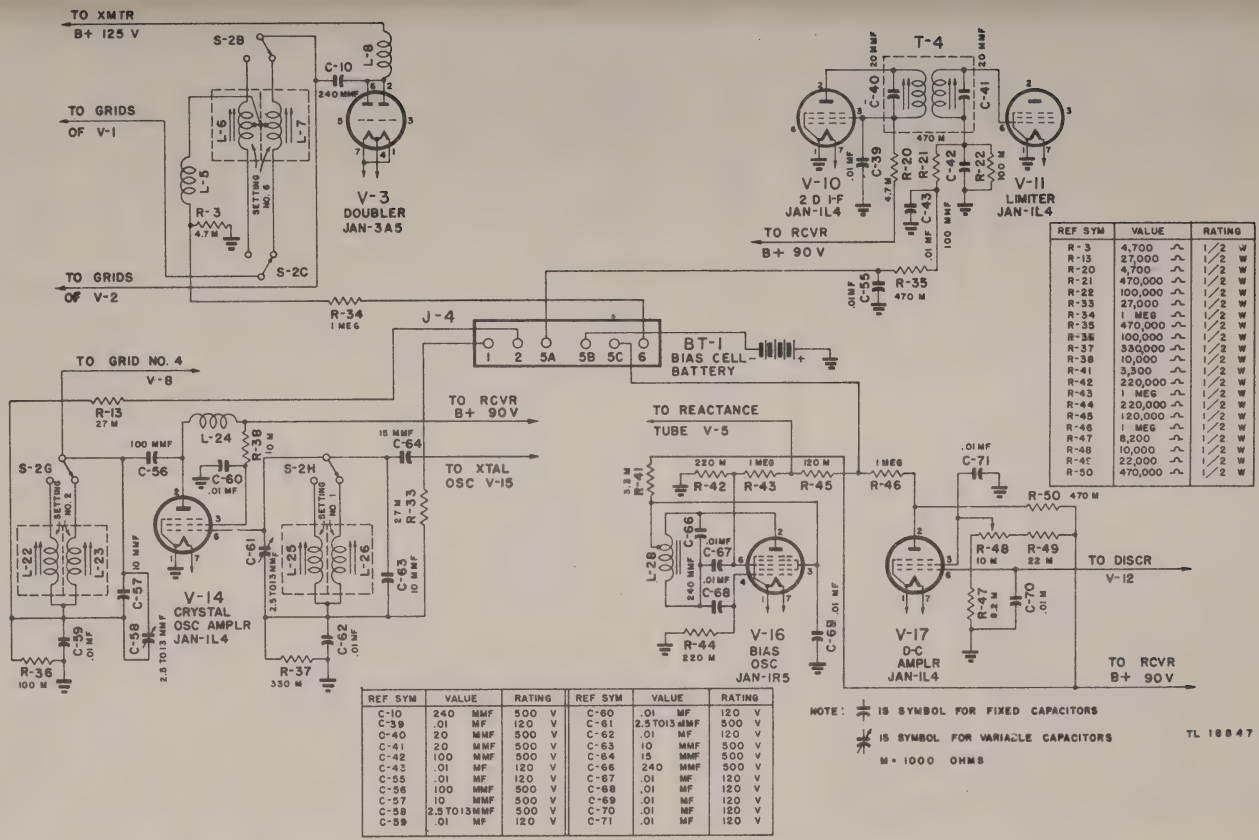
Figure 37. Receiver-Transmitter BC-1335, control circuit.

through the r-f amplifier consisting of V-6 and V-7 to V-8 (fig. 61). A crystal-controlled injector frequency is supplied to the converter tube through crystal oscillator V-15 and oscillator amplifier V-14. This frequency serves as a reference frequency standard. The beat between the transmitter output and the injector voltage is amplified in i-f amplifier V-9 and V-10 and is impressed on discriminator circuits V-12 and V-13 through limiter tube V-11. If the transmitter oscillator is exactly on the proper frequency the voltage appearing at the cathode of V-12 will be zero. This voltage is connected to V-17 d-c amplifier control grid through audio filter R-29 and C-70 (fig. 37). The static voltage on the plate of V-17 is approximately 45 volts and that supplied by the bias oscillator V-16 is approximately –50 volts. The tap between R-43 and R-45 is approximately 8 volts negative under normal operation and is used to supply d-c bias voltage to the reactance tube V-5. If for any reason the frequency of the transmitter oscillator increases, the voltage at the cathode of V-12 will become negative. This negative voltage is impressed on d-c amplifier V-17 and the plate voltage will increase because of the greater bias on the control grid. The voltage appearing between resistors R-43 and R-45 will also increase in the positive direction, reducing the bias on reactance tube V-5. A reduction in bias on V-5 causes an increase in out-of-phase r-f plate current (par. 72) which effectively increases the capacitance across the oscillator tank circuit, and reduces its frequency to bring the cathode voltage on V-12 back to zero. Similarly a shift in the opposite direction is corrected by voltage changes throughout the circuit in the opposite direction, and the reactance tube compensates by increasing the frequency.

b. The component circuits of the control system have been discussed in detail except for the voltage divider reistors R-43, R-45, and R-46 which insure that the proper negative voltage is applied to reactance tube V-5. The tap betwen R-45 and R-46 is connected to test point 5-C on test strip J-4 (fig. 61). This tap is used because calibrating cell BT-1 supplies 4 volts, and in the presetting procedure the voltage at 5-C is adjusted, with the transmitter oscillator tuning (SETTING NO. 5), to this standard voltage which is connected to 5-B on the test strip J-4. When the voltage between R-45 and R-46 is 4 volts negative, the voltage between R-43 and R-45 applies the correct bias to reactance tube V-5.

79. TEST CIRCUIT.

a. Test circuits (fig. 38) incorporated in the equipment are used primarily for presetting although they have some value in alignment. Voltages are brought out to pins on the test strip J-4



REF SYM	VALUE	RATING
R-3	4,700 Ω	1/2 W
R-13	27,000 Ω	1/2 W
R-20	4,700 Ω	1/2 W
R-21	470,000 Ω	1/2 W
R-22	100,000 Ω	1/2 W
R-33	27,000 Ω	1/2 W
R-34	1 MEG Ω	1/2 W
R-35	470,000 Ω	1/2 W
R-36	100,000 Ω	1/2 W
R-37	330,000 Ω	1/2 W
R-38	10,000 Ω	1/2 W
R-41	3,300 Ω	1/2 W
R-42	220,000 Ω	1/2 W
R-43	1 MEG Ω	1/2 W
R-44	220,000 Ω	1/2 W
R-45	120,000 Ω	1/2 W
R-46	1 MEG Ω	1/2 W
R-47	8,200 Ω	1/2 W
R-48	10,000 Ω	1/2 W
R-49	22,000 Ω	1/2 W
R-50	470,000 Ω	1/2 W

REF SYM	VALUE	RATING	REF SYM	VALUE	RATING
C-10	240 MMF	500 V	C-60	.01 MF	120 V
C-39	.01 MF	120 V	C-61	2.5 TO 13 MMF	500 V
C-40	20 MMF	500 V	C-62	.01 MF	120 V
C-41	20 MMF	500 V	C-63	10 MMF	500 V
C-42	100 MMF	500 V	C-64	15 MMF	500 V
C-43	.01 MF	120 V	C-66	240 MMF	500 V
C-55	.01 MF	120 V	C-67	.01 MF	120 V
C-56	100 MMF	500 V	C-68	.01 MF	120 V
C-57	10 MMF	500 V	C-69	.01 MF	120 V
C-58	2.5 TO 13 MMF	500 V	C-70	.01 MF	120 V
C-59	.01 MF	120 V	C-71	.01 MF	120 V

NOTE: ⏚ SYMBOL FOR FIXED CAPACITORS
✳ SYMBOL FOR VARIABLE CAPACITORS
M = 1000 OHMS

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Figure 38. Receiver-Transmitter BC-1335, test circuit.

which is numbered for convenience in presetting. Thus the voltage observed at pin No. 1 of J-4 is varied by SETTING NO. 1, that on pin No. 2 is varied by SETTING NO. 2. Pins 5-A, 5-B and 5-C are used in adjusting SETTING NO. 5. Pin. No. 6 is used in adjusting SETTING NO. 6. The voltage at pin No. 2 is the d-c bias voltage developed on the injector grid of mixer Tube JAN-1R5 (V-8). The voltage at pin 5-A is the voltage which appears at limiter grid V-11. 5-B is connected to standard cell BT-1 and is used only for calibrating eye tube V-18. 5-C is an indication of the bias on the reactance tube V-5 and pin No. 6 measures the voltage developed on the grids of r-f power amplifier V-1 and V-2.

b. R-f isolating resistor R-33 is in series with pin No. 1 on J-4, and R-13 is in series with pin No. 2 on J-4. 5-A is connected through an r-f filter C-55, R-35, C-43, and R-21 to the limiter grid circuit. R-f filter R-34 and C-54 is provided in series with the lead to pin No. 6 on J-4.

SECTION XII. TROUBLE SHOOTING

80. GENERAL TROUBLE-SHOOTING PROCEDURE.

No matter how well equipment is designed and manufactured, faults occur in service. When such faults occur, the repairman must locate and correct them as rapidly as possible. This section contains general information to aid personnel engaged in the important duty of trouble shooting.

a. Trouble-shooting Data. Take advantage of the material supplied in this manual to help in the rapid location of faults. Consult the following trouble-shooting data when necessary:

(1) Block diagram of Receiver-Transmitter BC-1335 (fig. 16).

(2) Complete schematic diagram (fig. 61).

(3) Simplified and partial schematic diagrams. These diagrams are particularly useful in trouble shooting, because the repairman can follow the electrical functioning of the circuits more easily than on the regular schematics, thus speeding trouble location.

(4) Voltage and resistance data for all socket connections.

(5) Illustrations of components. Front, top, and bottom views which aid in locating and identifying parts.

(6) Pin connections. Pin connections on sockets, plugs, and receptacles are numbered or lettered on the various diagrams.

(a) Seen from the bottom, pin connections are numbered in a clockwise direction around the sockets. On octal sockets the first pin clockwise from the keyway is the No. 1 pin.

(b) Plugs and receptacles are numbered on the side to which the associated connector is attached. To avoid confusion, some individual pins are identified by letters which appear directly on the connector.

b. Trouble-shooting Steps. The first step in servicing a defective radio set is to sectionalize the fault. Sectionalization means tracing the fault to the component or circuit responsible for the abnormal operation of the set. The second step is to localize the fault. Localization means tracing the fault to the defective part responsible for the abnormal condition. Some faults such as burned-out resistors, r-f arcing, and shorted transformers can be located by sight, smell, and hearing. The majority of faults, however, must be located by checking voltage and resistance.

c. Sectionalization. Careful observation of the performance of the radio set while turning the equipment on often sectionalizes the fault to the transmitter or the receiver. Additional sectionalizing of the fault will be discussed in paragraphs 85 and 86.

d. Localization. Paragraphs 87 to 91 describe the method of localizing faults. These paragraphs are accompanied by charts and diagrams which show the resistance and voltage at every socket pin connection.

e. Voltage Measurements. Voltage measurements are an almost indispensable aid to the repairman, because most troubles either result from abnormal voltages or produce abnormal voltages. Voltage measurements are taken easily, because they are always made between two points in a circuit and the circuit need not be interrupted.

(1) Unless otherwise specified, the voltages listed on the voltage charts are measured between the indicated points and ground.

(2) Always begin by setting the voltmeter on the highest range so that the voltmeter will not be overloaded. Then, if it is necessary to obtain increased accuracy, set the voltmeter to a lower range.

(3) In checking cathode voltage, remember that a reading can be obtained when the cathode resistor is actually open. The resistance of the meter may act as a cathode resistor. Thus, the cathode voltage may be approximately normal only as long as the voltmeter is connected between cathode and ground. Before the cathode voltage is measured, make a resistance check with a cold circuit to determine whether the cathode resistor is normal.

f. Voltmeter Loading. It is essential that the voltmeter resistance be at least 10 times as large as the resistance of the circuit across which the voltage is measured. If the voltmeter resistance is comparable to the circuit resistance, the voltmeter will indicate a

voltage lower than the actual voltage present when the voltmeter is removed from the circuit.

(1) The resistance of the voltmeter on any range can always be calculated by the following simple rule: Resistance of the voltmeter equals the ohms per volt multiplied by the full-scale range in volts. For example: The resistance of a 1,000-ohm-per-volt meter on the 300-volt range is 300,000 ohms (R = 1,000 ohms per volt times 300 volts = 300,000 ohms).

(2) To minimize the voltmeter loading in high-resistance circuits, use the highest voltmeter range. Although only a small deflection will be obtained (possibly only 5 divisions on a 100-division scale), the accuracy of the voltage measurement will be increased. The decreased loading of the voltmeter will more than compensate for the inaccuracy which results from reading only a small deflection on the scale of the voltmeter.

(3) When a voltmeter is loading a circuit, the effect can always be noted by comparing the voltage reading on two successive ranges. If the voltage readings on the two ranges do not agree, voltmeter loading is excessive. The reading (not the deflection) on the highest range will be greater than that on the lowest range. If the voltmeter is loading the circuit heavily, the deflection of the pointer will remain nearly the same when the voltmeter is shifted from one range to another.

(4) The ohm-per-volt sensitivity of the voltmeter used to obtain the readings recorded on the voltage and resistance charts in this manual is printed on each chart. Use a meter having the same ohm-per-volt sensitivity; otherwise it will be necessary to consider the effect of loading.

81. GENERAL PROCEDURE.

Because of the wide variety of possible trouble in Receiver-Transmitter BC-1335 it is not practicable to give a complete step-by-step analysis to fit all situations, but the proper procedure is outlined in this section. Always follow these steps in the order given, and correct any abnormal conditions before proceeding with further steps. Be alert for any abnormal conditions which may indicate a fault.

82. PRELIMINARY STEPS WITH COVER ON.

Before removing the covers to check the operation of the set inspect the following items:

a. Microphone, Headset, and Chest Set. Be certain that the microphone, headset, and chest set (if used) are in proper work-

ing order by replacing these items with equipment known to be good.

b. VOLUME Control and Switches. Be certain the 6V-12V voltage selector switch is in the proper position for the battery supply used. Be certain that the VOLUME control is on, and is turned fully clockwise.

c. Cording. Be certain that the power plug cord on the front of the receiver-transmitter is not frayed, broken, or short-circuited to ground. Make sure the wires are connected to the proper terminals on the connector (see TM 11-619).

d. Batteries. Make sure the battery used for power supply is charged, and that the connections are tight and not corroded. If the power supply is composed of three Batteries BB-54-A in Box CH-291, the charge is indicated by three indicator balls visible through a plexiglass window in the side of the battery case. If the battery is not equipped with these indicator balls, use a battery hydrometer to check the specific gravity of the electrolyte. If trouble is suspected in the equipment, the battery used for these test purposes should be at least half-charged.

e. Antennas and Siting. Make sure the antenna insulator is clean and free from dirt and moisture. If after these checks the equipment is still inoperative, the antenna system should be checked by replacing it with another antenna of the same type. If this is impractical, one of the three unused antenna systems may be substituted for the one in use. **Remember that the combat antenna should not be expected to operate as effectively as the other three recommended types.** If the equipment still does not operate satisfactorily move to a better location, away from overhead wires, trees, or any equipment that might produce electrical interference.

83. PRELIMINARY STEPS WITH COVER OFF.

If the trouble has not been located, remove the cover for further checks.

a. Switch Positions. Be certain that the alignment switch is in the ALIGN OTHERS position, and that the OPERATE-ALIGN switch is in the OPERATE position, and that the test prod is in its holder.

b. Presetting Check. Check presetting of the equipment following the outline in the lid of Receiver-Transmitter BC-1335, or in section XV.

NOTE: Any abnormal conditions noted in this presetting procedure should be investigated thoroughly, using test equipment if necessary.

c. Fuse and Vibrator. Turn the set on with the VOLUME control. Feel the vibrator. A slight vibration should be noticed and a low hum should be heard if the vibrator is operating properly. If not, proceed as follows: Remove the fuse from its holder. If the fuse is burned out, remove the VIBRATOR IN USE by loosening the wingnuts on top of the power transformer, removing the hold-down bracket, and pulling the vibrator from its socket. Replace the fuse with one of three spares on top of the power transformer. Make certain that the VOLUME control is on, and is turned fully clockwise. Remove and examine the fuse. If the fuse is burned out again, test equipment will be needed for further trouble shooting. If the fuse is in good condition replace it in the fuse holder, remove the SPARE VIBRATOR from its socket, and insert it in the VIBRATOR IN USE socket. If the fuse blows, test equipment is required for further trouble shooting.

d. Testing Tube JAN-0B3/VR90. If the power supply is operating properly, Tube JAN-0B3/VR90 should glow with a bluish light. If not, it is an indication that the tube should be replaced, that the battery voltage is low, or that test equipment is required for trouble shooting. Remove the tube. If the set operates, a new tube is required. The set may be operated for short periods with no Tube JAN-0B3/VR90 in the socket, **but this operation should be used only in an emergency,** since serious damage will result to the equipment.

e. Tube Replacement. In the field, check tubes for proper operation by substitution. One tube of each type is included in the spare tube compartment. Substitute them one at a time for the tubes in the equipment, and check for proper operation after each substitution. **Turn off the equipment before removing any tube from its socket.** In all cases replace the original tube if the equipment does not operate satisfactorily after substituting a spare tube. **Do not substitute tubes at random unless the equipment is being used with a 6-volt supply.** If the equipment is being operated from a 12-volt source, check **receiver tubes only** (those on the indicator tube side of the test strip) by direct substitution. Check **transmitter** tubes by removing all six tubes and inserting them in receiver circuits sockets using their types.

f. Indicator Lamps. Spare lamps are mounted on the receiver-transmitter chassis for replacing burned out or broken lamps used for tuning SETTING NO. 7. If the lamp does not glow, replace it with one of the spares located in dummy sockets on the chassis. Failure of this tuning indicator lamp will rarely cause improper operation of the equipment; spares are provided so that presetting of SETTING NO. 7 may be made accurately.

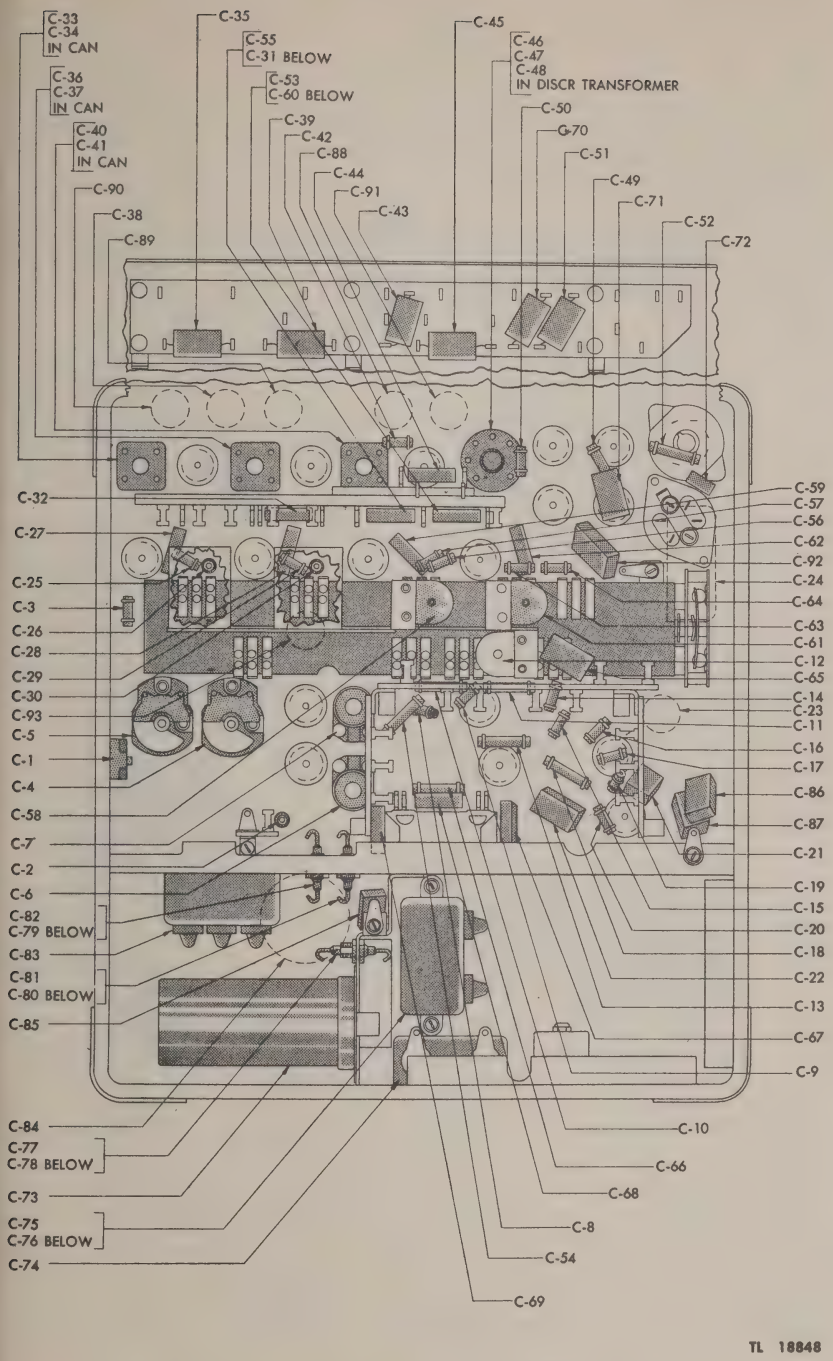


Figure 39. Receiver-Transmitter BC-1335, capacitors.

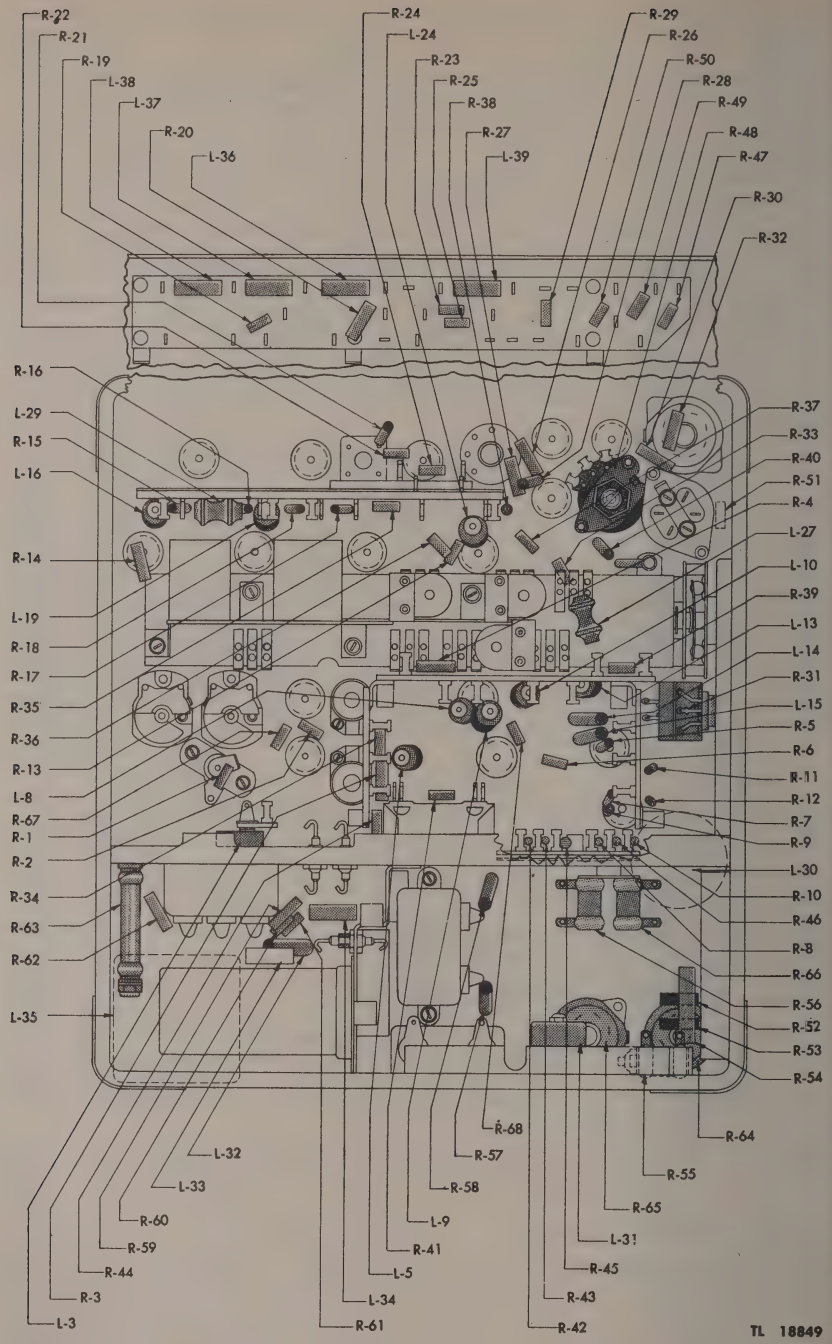


Figure 40. Receiver-Transmitter BC-1335, resistors and chokes.

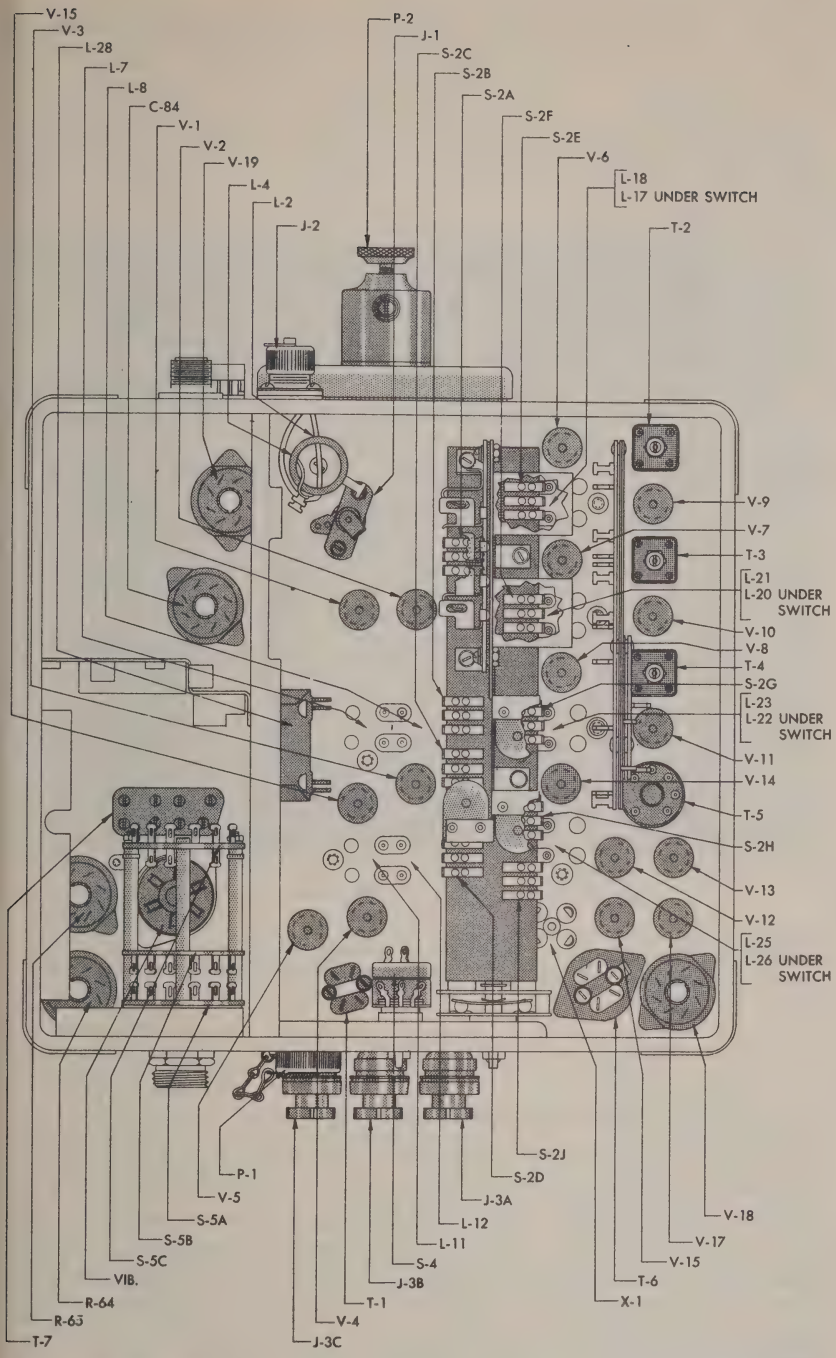


Figure 41. Receiver-Transmitter BC-1335, bottom view.

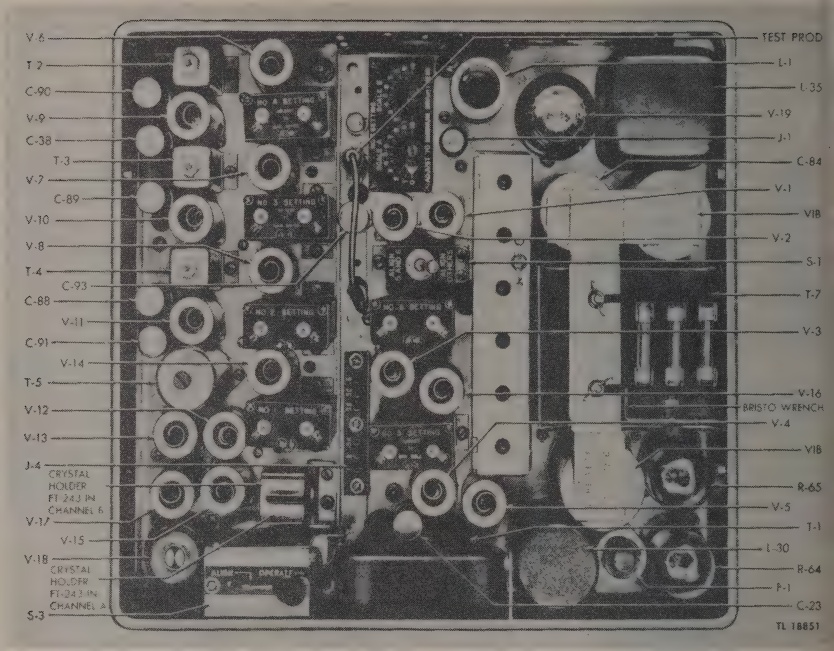


Figure 42. Receiver-Transmitter BC-1335, top view.

84. TROUBLE-SHOOTING PROCEDURE.

If preliminary steps do not locate the trouble, refer to the accompanying trouble charts. The charts aid in trouble shooting the receiver section (par. 85), transmitter section (par. 86), and power supply section (par. 87) of the receiver-transmitter. These charts list the symptoms which may be easily recognized by the operator, the probable location of the existing trouble, and the recommended correction. By proper use of these charts, the operator can isolate the trouble to one particular section of the receiver-transmitter, and thus save time that might otherwise be lost in checking components that are free of trouble.

85. SECTIONALIZING TROUBLE IN RECEIVER SECTION.

Symptoms	Probable trouble	Corrections
1. Audible hiss but no signals heard.	1. Open antenna circuit or poor connection to antenna.	1. Clean and tighten antenna connection. Check connections to L-1, C-1 antenna post and L-4.
2. Receiver dead.	2. 6-12-volt switch in wrong position. Open circuit in cable connector assembly.	2. Throw switch for correct battery voltage. Repair or replace.
3. No signal at headset when audio output of signal generator is fed to a-f control grid (pin No. 5 of V-13).	3. Receiver a-f p-a tube V-13. Defective components of a-f stage.	3. Replace. Localize by voltage and resistance measurements.
4. No signal at headset when audio output of signal generator is fed to ungrounded end of discriminator load resistor (pin No. 3 of V-12).	4. Defective capacitor C-51, resistor R-32, or volume control R-31.	4. Replace.
5. No signal at headset when frequency-modulated 4.3-mc signal is fed to control grid of limiter tube (pin No. 6 of V-11).	5. Defective limiter tube V-11. Defective components of limiter stage.	5. Replace. Localize by voltage and resistance measurements.
6. No signal at headset when frequency-modulated 4.3-mc signal is fed to control grid of 2nd i-f tube (pin No. 6 of V-10).	6. Defective i-f amplifier tube V-10. Defective components of 2d i-f stage.	6. Replace. Localize by voltage and resistance measurements.
7. No signal at headset when frequency-modulated 4.3-mc signal is fed to control grid of 1st i-f tube (pin No. 6 of V-9).	7. Defective i-f amplifier tube V-9. Defective components of 1st i-f stage.	7. Replace. Localize by voltage and resistance measurements.
8. No signal at headset when frequency-modulated signal of same frequency as operating channel is fed to control grid of mixer tube (pin No. 6 of V-8).	8. Defective mixer tube V-8. Defective components of mixer stage. Defective components of crystal oscillator or crystal-oscillator amplifier circuits.	8. Replace. Localize by voltage and resistance measurements. Sectionalize as in items 12 to 14 inclusive.

85. SECTIONALIZING TROUBLE IN RECEIVER SECTION (Cont.).

Symptoms	*Probable trouble*	*Corrections*
9. No signal at headset when frequency-modulated r-f signal of same frequency as operating channel is fed to control grid of 2d r-f tube (pin No. 6 of V-7).	9. Defective r-f tube V-7. Defective components of 2nd r-f stage.	9. Replace. Localize by voltage and resistance measurements.
10. No signal at headset when frequency-modulated r-f signal of same frequency as operating channel is fed to control grid of 1st r-f tube (pin No. 6 of V-6).	10. Defective r-f tube V-6. Defective components of 1st r-f stage.	10. Replace. Localize by voltage and resistance measurements.
11. No signal at headset when frequency-modulated r-f signal of same frequency as operating channel is fed to antenna terminal in series with approximately 1,800 ohms.	11. Defective antenna stage.	11. Localize by voltage and resistance measurements.
12. No reading or low reading on electronic voltmeter when probe is connected to control grid (pin No. 3) on crystal oscillator tube V-15.	12. Defective crystal. Defective crystal oscillator tube V-15. Defective crystal oscillator circuit.	12. Replace. Replace. Localize by voltage and resistance checks.
13. No reading on electronic voltmeter with probe in pin No. 1 on test strip J-4.	13. Defective crystal oscillator amplifier tube V-14. Components of grid circuits of V-14 defective.	13. Replace. Localize by voltage and resistance measurements.
14. No reading on electronic voltmeter with probe in Pin No. 2 on test strip J-4.	14. Defective converter tube V-8. Defective components in plate circuit of crystal oscillator amplifier V-14.	14. Replace. Localize by voltage and resistance measurements.

86. SECTIONALIZING TROUBLE IN TRANSMITTER SECTION.

Symptoms	*Probable trouble*	*Corrections*
1. Transmitter oscillator inoperative; no reading or low reading on electronic voltmeter with probe connected to terminal 60 (fig. 43) (junction R-5, L-14, L-15). With press-to-talk switch depressed.	1. Defective transmitter oscillator tube V-4. Defective components transmitter oscillator stage.	1. Replace V-4. Localize by resistance and voltage measurements.
2. Transmitter doubler inoperative with press-to-talk switch depressed; no reading or low reading on electronic voltmeter with probe connected to terminal 52 (junction of R-4, L-9, L-10).	2. Defective doubler tube V-3. Defective components in grid circuit of V-3.	2. Replace V-3. Localize by resistance and voltage measurements.
3. Transmitter doubler inoperative; no reading or low reading on electronic voltmeter with probe connected to pin No. 6 on test strip J-4, with press-to-talk switch depressed.	3. Defective p-a tube V-1 or V-2 or both. Defective doubler tube V-3. Defective components in plate circuit of V-3 or grid circuit of V-1 and V-2.	3. Replace V-1 or V-2 or both. Replace V-3. Localize by resistance and voltage measurements.
4. No reading or low reading on electronic voltmeter with test probe on control grid of 1st r-f amplifier V-6 (pin No. 6), with press-to-talk switch depressed.	4. Defective V-1 or V-2 or both. Transmitter switch in ALIGN 5 AND 6 position. Defective plate circuit of r-f power amplifier stage. Defective r-f tube V-6.	4. Replace V-1 or V-2 or both. Throw switch to ALIGN OTHERS. Localize with resistance and voltage measurements. Replace.
5. Bias oscillator V-16 not operating. No reading on electronic voltmeter with probe on injector grid (pin No. 4) or on control grid (pin No. 6) of bias oscillator tube V-16 with press-to-talk switch depressed.	5. Defective tube V-16. Defective components in bias oscillator circuit of V-16.	5. Replace. Localize with resistance and voltage measurements.

86. SECTIONALIZING TROUBLE IN TRANSMITTER SECTION (Cont.).

Symptoms	Probable trouble	Terminal
6. No audio present in headset or serious distortion noted. Depress press-to-talk switch and speak into microphone.	6. Defective reactance tube V-5.	6. Replace.
	Defective d-c amplifier circuit.	Localize with resistance and voltage measurements.
	Defective components in reactance tube circuit.	Localize with resistance and voltage measurements.
	Bias oscillator not operating.	See item 5 above.
	SETTING No. 5 improperly preset.	Preset.
7. No audio present in headset connected between ground and terminal 3 on T-1. Depress press-to-talk switch and speak into microphone.	7. Defective microphone Jack J-3A.	7. Localize with resistance and voltage measurements. Replace or repair.
	Defective transformer T-1.	Replace.

87. LOCALIZING TROUBLE IN POWER SUPPLY SECTION.

Symptoms	Probable trouble	Corrections
1. Plate supply dead. No buzzing sound. No plate or filament voltage.	1. Fuse blown; vibrator stuck.	1. Replace.
	Open circuit in cable connecting to P-1.	Check continuity.
	Open circuit from P-1 to switch S-5A.	Check continuity. Check R-66.
	Volume control switch S-4 defective.	Check continuity; VOLUME control switch on.
	6V-12V switch in wrong position.	Throw switch to proper position.
2. No B+ voltage at C-79 or C-80. Filament supply voltages normal. Buzzing sound from vibrator.	2. Defective vibrator.	2. Replace.
	C-84A or C-84B short circuited.	Replace (this is the plug-in electrolytic); check continuity with electrolytic removed from socket.
	Defective power transformer T-7.	Check voltage at terminal 8 and continuity of windings with vibrator removed.

87. LOCALIZING TROUBLE IN POWER SUPPLY SECTION (Cont.).

Symptoms	Probable trouble	Corrections
	C-80 or C-83A short circuited.	Disconnect and check continuity.
	L-34 or L-35 open circuited.	Check continuity.
	Buffer capacitors C-75 or C-76 defective.	Check continuity. Replace with capacitors of equal or higher voltage rating.
3. No B+ voltages at C-79 or C-80. Filament voltages normal. No buzzing sound from vibrator.	3. L-31 open.	3. Check continuity. Check voltage supplied to each terminal.
	Poor contacts in switch S-5C.	Replace.
	Open circuit to pin No. 4 on vibrator socket.	Check continuity.
	R-56 open.	Check continuity; S-5 in 12-v position.
	Defective vibrator.	Replace.
	Defective transformer T-7.	Check windings for continuity. Replace T-7 if necessary.
4. Normal B+ voltages at C-79 and C-80 but not filament voltages.	4. L-30 open.	4. Check continuity and replace L-30 if necessary.
	C-73 shorted.	Replace.
5. Receiver filament voltage high at C-82, other voltages normal.	5. Tubes in receiver filament circuit open.	5. Replace.
	R-59, R-60 and R-61 short-circuited.	Check continuity.
6. Receiver filament voltage low at C-82, other voltages normal.	6. R-52, R-53 or R-54 open.	6. Replace.
	Ballast resistor R-64 open.	Replace.
	C-88, C-89, C-90, and C-91 short-circuited or their leads short-circuited to ground.	Repair or replace.
	Either R-59, R-60, or R-61 open.	Replace.
	L-32 shows high resistance.	Repair or replace.
7. Receiver filament voltage zero at C-82; other voltages normal.	7. C-92, C-82, C-83C or C-78 shorted.	7. Replace or repair. Check ballast resistor R-64 and replace if necessary.
	L-32 open.	Replace.
	Poor contacts on switch S-5A.	Replace S-5A.
	R-59, R-60, and R-61 open.	Replace.

Symptoms	Probable trouble	Corrections
8. Transmitter filament voltage high at C-81; other voltages normal.	8. Press-to-talk switch not depressed or is not grounded at point X on transmitter filament string.	8. Check press-to-talk switch circuit. Repair.
	Tubes in transmitter filament string have open filament circuit.	Replace but check for abnormal conditions causing failure.
	Ballast tube R-65 defective.	Replace.
	R-67 open.	Replace.
	Defective J-3A.	Repair or replace J-3A, J-3B and J-3C.
9. Transmitter filament voltage low at C-81; other voltages normal.	9. C-93 or its lead short-circuited to ground.	9. Replace or repair C-93.
	Defective ballast resistor R-65.	Replace.
	L-33 shows high resistance.	Repair or replace.
10. Transmitter filament voltage zero at C-81; other voltages normal.	10. Ballast resistor R-65 open.	10. Replace.
	C-81, C-83B or C-77 short-circuited.	Replace.
	L-33 open.	Replace.
11. No B+ voltage at C-79. V-19 does not glow.	11. Defective tube V-19.	11. Replace.
	R-63 open.	Replace.
	C-79 short-circuited to ground.	Repair or replace.
12. No B+ voltage at C-79. VR-90 (V-19) tube glows.	12. C-38 or C-79 or leads to them short-circuited to ground.	12. Repair or replace.
	R-62 open.	Isolate by removing lead C-79 and checking continuity. Repair or replace.

88. TERMINAL IDENTIFICATION CHART.

For further localization of trouble in Receiver-Transmitter BC-1335 the table below lists terminals and components with common connections at each terminal. This table is keyed to figures 43 through 48, which shows physical location of each terminal, and normal resistances and voltages to ground. Figure 49 shows base connections on all tubes used in Receiver-Transmitter BC-1335.

Terminal No.	Junction point	Circuit
1	L-38, pin No. 7 of V-6.	Filament of 1st r-f (JAN-1L4).
2	L-37, L-38, pin No. 7 of V-9, terminal 6.	Filament of 1st i-f (JAN-1L4).
3	L-36, L-37, pin No. 7 of V-10.	Filament of 2d i-f (JAN-1L4).
4	L-36, pin No. 7 of V-11.	Filament of limiter (JAN-1L4).
5	C-43, R-21, terminal 31.	V-11 limiter (JAN-1L4) grid circuit.
6	L-39, terminal 2.	Filament of 1st i-f V-9 (JAN-1L4).
7	L-39, C-91, pin No. 1 of V-12.	Filament of discriminator V-12 (JAN-1A3).
8	R-29, C-70, pin No. 6 of V-17.	Signal grid of d-c amplifier (JAN-1L4).
9	C-51, lead to ALIGN-OPERATE switch.	Discriminator (JAN-1A3) cathode circuit to ground on OPERATE position of alignment switch, through R-30, R-31, R-32.
10	R-50, pin No. 2 of V-17, terminal 85.	Plate of d-c amplifier V-17 (JAN-1L4).
11	R-48, R-49.	D-c amplifier V-17 (JAN-1L4) screen-grid resistor string.
12	R-47, R-48	D-c amplifier V-17 (JAN-1L4) screen-grid resistor string.
13	B + (90 v), R-19, C-38.	Plate supply of 1st i-f V-9 (JAN-1L4).
14	B + (90 v), R-20.	Plate supply of 2d i-f V-10 (JAN-1L4).
15	B + (90 v), R-23, R-25.	Plate and screen supply of limiter V-11 (JAN-1L4).
16	R-23, pin 3 of V-11.	Screen grid of limiter V-11 (JAN-1L4).
17	R-49, B + (90 v).	B + (90 v) end of V-17 d-c amplifier (JAN-1L4) screen-grid resistor string.
18	C-35, ground lead.	Screen-grid bypass capacitor ground on 1st i-f V-9 (JAN-1L4).
19	C-35, R-19, pin 3 of V-9.	Screen and plate voltage circuit of 1st i-f V-9 (JAN-1L4).
20	C-39, ground lead.	Screen-grid bypass capacitor ground on 2d i-f V-10 (JAN-1L4).
21	C-39, R-20, pin 3 of V-10.	Screen and plate voltage circuit of 2d i-f V-10 (JAN-1L4).
22	C-43, ground lead.	V-11 limiter (JAN-1L4) grid circuit.
23	C-45, ground lead.	V-11 limiter (JAN-1L4) plate supply bypass capacitor ground.
24	C-45, R-25, discriminator coil primary.	Plate circuit of V-11 limiter (JAN-1L4).
25	C-70, ground lead.	Grid bypass capacitor ground on V-17 d-c amplifier (JAN-1L4).
26	R-29, C-51, pin No. 3 of V-12.	Cathode of discriminator V-12 (JAN-1A3).
27	B + (90 v), R-50.	Plate supply of V-17 d-c amplifier (JAN-1L4).
28	R-47, ground lead.	Ground on screen resistor string of V-17 d-c amplifier (JAN-1L4).

Terminal No.	Junction point	Circuit
29	R-24, C-44, ground lead.	Ground for screen resistor and bypass capacitor on limiter (JAN-1L4).
30	R-24, C-44, pin No. 3 on V-11.	Screen voltage on limiter (JAN-1L4).
31	R-35, terminal 5.	V-11 limiter (JAN-1L4) grid circuit.
32	R-28, terminal 42.	Discriminator test point.
33	R-15, L-16, pin No. 3 of V-6.	Plate and screen voltage on 1st r-f V-6 (JAN-1L4).
34	B + (90 v), L-29.	Plate supply of V-8 mixer (JAN-1R5), and V-14 crystal oscillator amplifier (JAN-1L4).
35	L-29, terminals 37 and 39 B + (90 v).	Plate supply of V-8 mixer (JAN-1R5), and V-14 crystal oscillator amplifier (JAN-1L4).
36	R-16, L-19, pin No. 3 of V-7.	Plate and screen voltage on 2d r-f V-7 (JAN-1L4).
37	B + (90 v), R-18, R-17.	Plate and screen supply of V-8 mixer (JAN-1R5).
38	R-35, terminal 40, test prod jack assembly point No. 5A.	V-11 limiter grid circuit (1L4).
39	B + (90 v), R-38, L-24.	Plate supply for V-14 crystal-oscillator amplifier (JAN-1L4).
40	Terminal 38, C-55.	V-11 limiter grid circuit (JAN-1L4).
41	C-53, C-55, ground lead.	Ground, for limiter grid filter capacitor C-55, and discriminator test point capacitor C-53.
42	C-53, terminal 32.	Discriminator test point.
43	B + (90 v), R-15.	Plate supply on V-6, 1st r-f (JAN-1L4).
44	B + (90 v), R-16.	Plate supply on V-7, 2d r-f (JAN-1L4).
45	R-18, C-32, primary of 1st i-f transformer.	Plate circuit of V-8 mixer (JAN-1R5).
46	C-32, ground lead.	Ground for plate filter bypass capacitor on V-8 mixer (JAN-1R5).
47	R-17, C-31, pin No. 3 on V-8.	Screen grid on mixer V-8 (JAN-1R5).
48	C-31, C-60, ground lead.	Ground for screen bypass capacitor: C-31 on V-8 mixer (JAN-1R5), and C-60 on V-14 crystal-oscillator amplifier (JAN-1L4).
49	C-60, R-38, pin No. 3 on V-14.	Screen voltage on crystal-oscillator amplifier V-14 (JAN-1L4).
50	Ground lead, C-54, R-4.	Ground: for grid bias R-4 on V-3 doubler (3A5), and filter capacitor C-54 on p-a grid drive lead to J-4 test strip point No. 6.
51	B + (125 v), L-8.	Plate supply for V-3 doubler (JAN-3A5).
52	R-4, L-9, terminal 53.	Grid circuit on V-3 doubler (JAN-3A5).
53	L-10, terminal 52.	Grid circuit on V-3 doubler (JAN-3A5).
54	B + (125 v), L-13.	Plate supply for V-4 transmitter oscillator (JAN-3A5).

Terminal No.	Junction point	Circuit
55	L-27, C-65, R-39.	Plate circuit for V-15 crystal oscillator (3Q4).
56	B + (90 v), R-39.	Plate supply for V-15 crystal-oscillator (JAN-3Q4).
57	R-34, C-54, test prod jack assembly point No. 6 lead	Grid circuit of V-1 and V-2 power amplifier (JAN-3A5).
58	R-34, R-3, L-5.	Grid circuit of V-1 and V-2 power amplifier (JAN-3A5).
59	R-3, ground lead.	Ground for grid circuit of V-1 and V-2 power amplifier (JAN-3A5).
60	R-5, L-14, L-15.	Grid circuit of V-4 transmitter oscillator (JAN-3A5).
61	R-7, C-19.	Grid circuit of V-5 reactance tube (JAN-3Q4).
62	R-9, R-11, R-12, C-21.	Grid circuit of V-5 reactance tube (JAN-3Q4).
63	C-2, ground lead.	Ground on filter capacitor on B + (125 v) to tuned circuit of V-1 and V-2 power amplifier (JAN-3A5).
64	C-2, L-3.	B + (125 v) supply to tuned circuit of V-1 and V-2 power amplifier (JAN-3A5).
65	B + (90 v), C-79.	Receiver plate supply.
66	B + (125 v), C-80.	Transmitter plate supply.
67	C-82, R-59, R-60, R-61, receiver filament lead.	Receiver filament supply.
68	C-81, transmitter filament lead.	Transmitter filament supply.
69	R-41, C-69, oscillator coil tap lead, pin No. 3 of V-16.	Bias oscillator (JAN-1R5) tuned circuit.
70	B + (90 v), R-41.	Plate supply for V-16 bias oscillator (JAN-1R5).
71	C-66, oscillator coil end lead, pin No. 2 of V-16.	Bias oscillator (JAN-1R5) plate and tuned circuit.
72	C-66, oscillator coil end lead, terminal 74.	Bias oscillator V-16 (JAN-1R5) tuned circuit.
73	R-44, C-68, pin No. 4 of V-16.	Bias oscillator V-16 (JAN-1R5), 1st grid.
74	C-67, C-68, terminal 72.	Bias oscillator V-16 (JAN-1R5) tuned circuit.
75	R-42, ground lead.	Ground on V-16 bias oscillator (JAN-1R5) load resistor.
76	R-43, terminal 81.	Output of V-16 bias oscillator (JAN-1R5).
77	R-45, terminal 82.	A-f-c voltage divider.
78	R-8, C-22, pin No. 4 of V-5.	Screen voltage on reactance tube V-5 (JAN-3Q4).
79	R-46, terminal 83.	A-f-c voltage divider.
80	R-10, microphone transformer primary lead.	Terminal 2 on microphone transformer T-10.

Terminal No.	Junction point	Circuit
81	R-42, C-67, terminal 76, pin No. 6 of V-16.	Output of bias oscillator (JAN-1R5), negative end of a-f-c voltage divider.
82	R-43, terminal 77, terminal 4 on microphone transformer secondary.	A-f-c voltage divider point supplying V-5 reactance tube (JAN-3Q4) grid bias.
83	R-45, terminal 79, test prod jack assembly point No. 5C.	A-f-c voltage divider test point for adjusting correct V-5 reactance tube (JAN-3Q4) grid bias, with reference to BT-1 bias battery.
84	B + (90 v), R-8.	Screen supply voltage for V-5 reactance tube (JAN-3Q4).
85	R-46, terminal 10.	Plate of V-17 d-c amplifier (JAN-1L4), positive end of a-f-c voltage divider.
86	R-10, transmitter filament lead.	Transmitter filament supply to microphone transmitter T-1.
87	L-35, R-63, pin No. 3 on C-84B socket.	Filter output to B + (125 v).
88	L-35, terminal 89.	Input to filter on B +.
89	C-83A, terminal 88, pin No. 5 on C-84A socket.	Input to filter on B +.
90	C-83B, terminal 68, L-33.	Hash filter output to transmitter filament circuit.
91	C-83C, L-32, R-59, R-60, R-61.	Hash filter on receiver filament circuit.
92	L-32, C-78, terminal 121.	Input to hash filter on receiver filament circuit.
93	L-33, C-77, terminal 115.	Input to hash filter on transmitter filament circuit.
94	T-7 (ct), L-34, C-85.	Center tap terminal 8 on power transformer.
95	C-73, terminal 5 of R-65 (3H-1-7).	Hash filter on input to R-64 and R-65 (3H-1-7 tubes).
96	C-75, R-58.	T-7 power transformer secondary.
97	C-75, R-57.	T-7 power transformer secondary.
98	C-76, terminal 6 on T-7.	Power transformer primary.
99	C-76, terminal 1 on T-7.	Power transformer primary.
100	C-74A, L-31, lead to R-55, lead to S-4.	Filter on supply to T-7 power transformer primary.
101	C-74B, L-31, terminal 107.	Filter on supply to T-7 power transformer primary.
102	S-5C rear, pin No. 1 on vibrator connection 1 on T-7.	Vibrator primary circuit.
103	S-5C rear, terminal 4 on T-7.	Vibrator primary circuit.
104	S-5C rear, terminal 5 on T-7.	Center tap on a primary winding of power transformer.
105	S-5C rear, terminal 3 on T-7, connected to terminal 109.	A power transformer primary winding.

Terminal No.	Junction point	Circuit
106	S-5C rear, terminal 2 on T-7.	Center tap on a primary winding of power transformer.
107	S-5C rear, terminal 101.	Input from filter to primaries of power transformer T-7.
108	S-5C front, R-56, pin No. 3 of vib.	Vibrator primary circuit.
109	S-5C front, connected to terminal 105.	Power transformer T-7 primary winding.
110	S-5C front, pin No. 5 of vibrator.	Primary circuit of vibrator.
111	S-5B, no connection.	
112	S-5B, R-55, S-3A.	Filament voltage for V-18 indicator (JAN-6AF6G).
113	S-5B, R-55.	Filament voltage for V-18 indicator (JAN-6AF6G).
114	S-5B, pin No. 7 on R-65.	Transmitter filament voltage on ballast resistor R-65 (3H-1-7).
115	S-5B, C-77.	Input to hash filter on transmitter filament circuit.
116	S-5B, pin No. 2 on R-65.	Transmitter filament voltage on ballast resistor R-65 (3H-1-7).
117	S-5A, R-66.	12-volt input through R-66 from P-1 power connector, pin C.
118	S-5A, F-1.	Fuse circuit.
119	S-5A, P-1.	6-volt input from B pin on power connector.
120	S-5A, pin No. 7 on R-64.	Receiver filament voltage on ballast resistor R-64 (3H-1-7).
121	S-5A, C-78.	Input to hash filter on receiver filament circuit.
122	S-5A, pin No. 2 on R-64.	Receiver filament voltage on ballast resistor R-64 (3H-1-7).

89. POINT-TO-POINT RESISTANCE MEASUREMENTS.

Voltage tests can be made with either a 1,000-ohm-per-volt voltmeter (figs. 45 and 46) or a vacuum-tube voltmeter (figs. 43 and 44). Any accurate ohmmeter can be used to measure resistances. If the voltage or resistance measured at any terminal differs greatly from the value given in the diagrams (figs. 43 through 48), check the terminal identification chart (par. 88) and the schematic diagram (fig. 61) to help locate the particular component that is defective. If the resistances of components differ greatly from the values given in the table below, these components probably are defective. Voltage and resistance values given are approximate and vary with different sets, different types of test equipment, and especially with the condition of the battery in use.

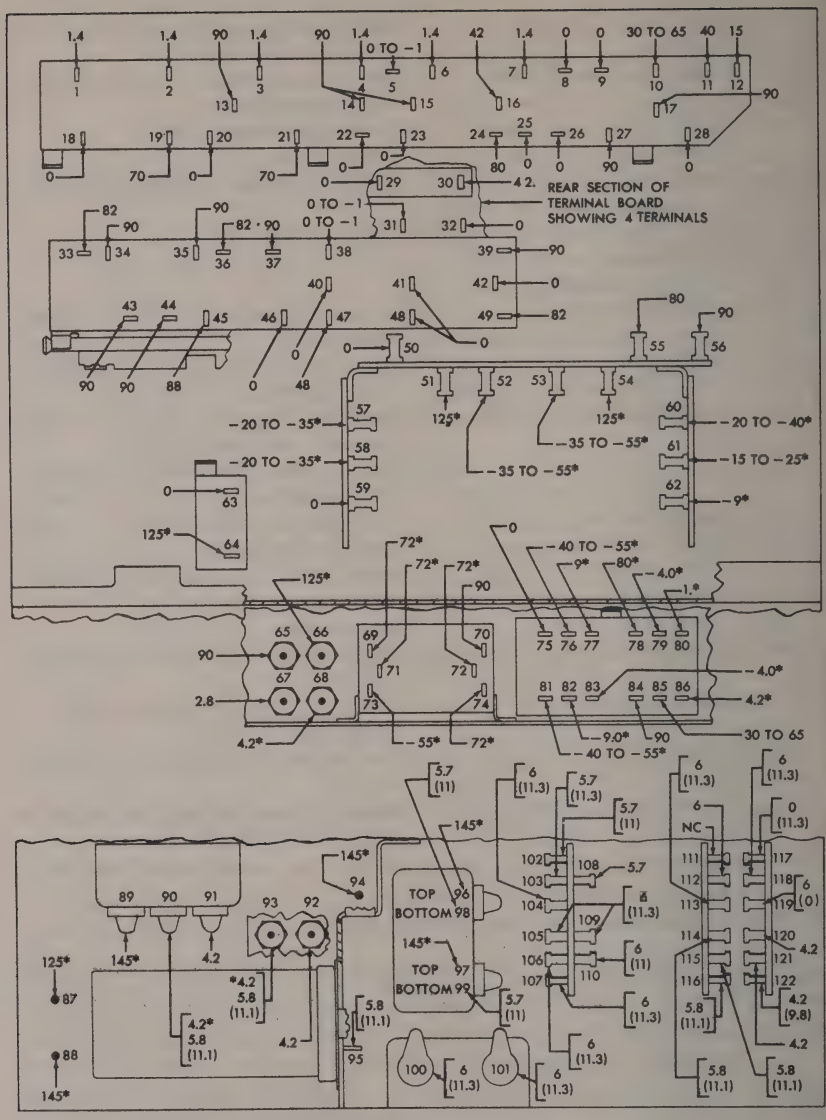
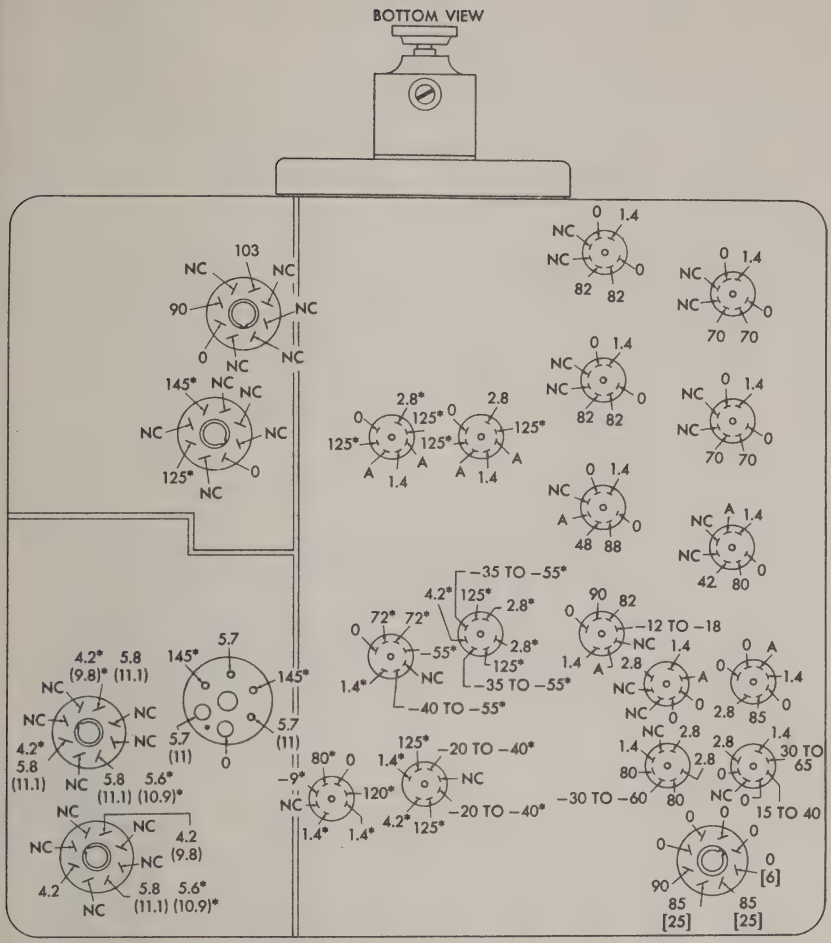


Figure 43. Terminal panel voltage diagram taken with electronic voltmeter.



Unless otherwise noted, readings are made under the following conditions:

1. Transmitter Switch in ALIGN-OTHERS position.
2. Test prod in holder.
3. ALIGN-OPERATE switch on OPERATE.
4. No antenna connected.
5. 6-volt supply with 6-12-volt switch in 6-volt position.
6. Press-to-talk switch not depressed.
7. Voltages measured to ground.

* Voltages read with press-to-talk switch depressed.

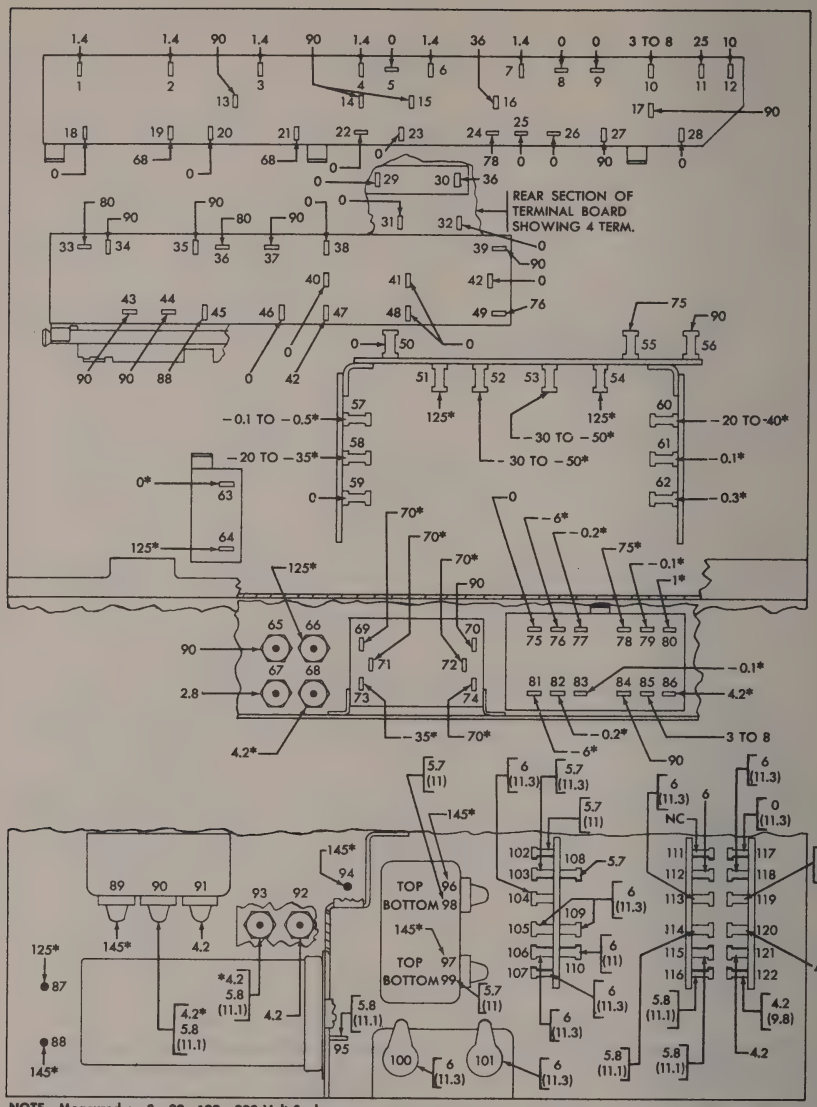
( ) Voltages read with 12-volt supply. 6-12-volt switch in 12-volt position.

[ ] Voltages read with ALIGN-OPERATE switch on ALIGN.

A. Points where voltmeter lead detunes circuit, and readings are not reliable.

TL 18853

Figure 44. Tube socket voltage diagram, bottom view, taken with electronic voltmeter.



NOTE—Measured on 3—30—100—300 Volt Scales.

Unless otherwise noted, readings are made under the following conditions:

1. Transmitter Switch in ALIGN-OTHERS position.
2. Test prod in holder.
3. ALIGN-OPERATE switch on OPERATE.
4. No antenna connected.
5. 6-volt supply with 6-12-volt switch in 6-volt position.
6. Press-to-talk switch not depressed.
7. Voltages measured to ground.

* Voltages read with press-to-talk switch depressed.
( ) Voltages read with 12-volt supply. 6-12-volt switch in 12-volt position.
[ ] Voltages read with ALIGN-OPERATE switch on ALIGN.

TL 18854

Figure 45. Terminal panel voltage diagram taken with 1,000 ohms-per-volt voltmeter.

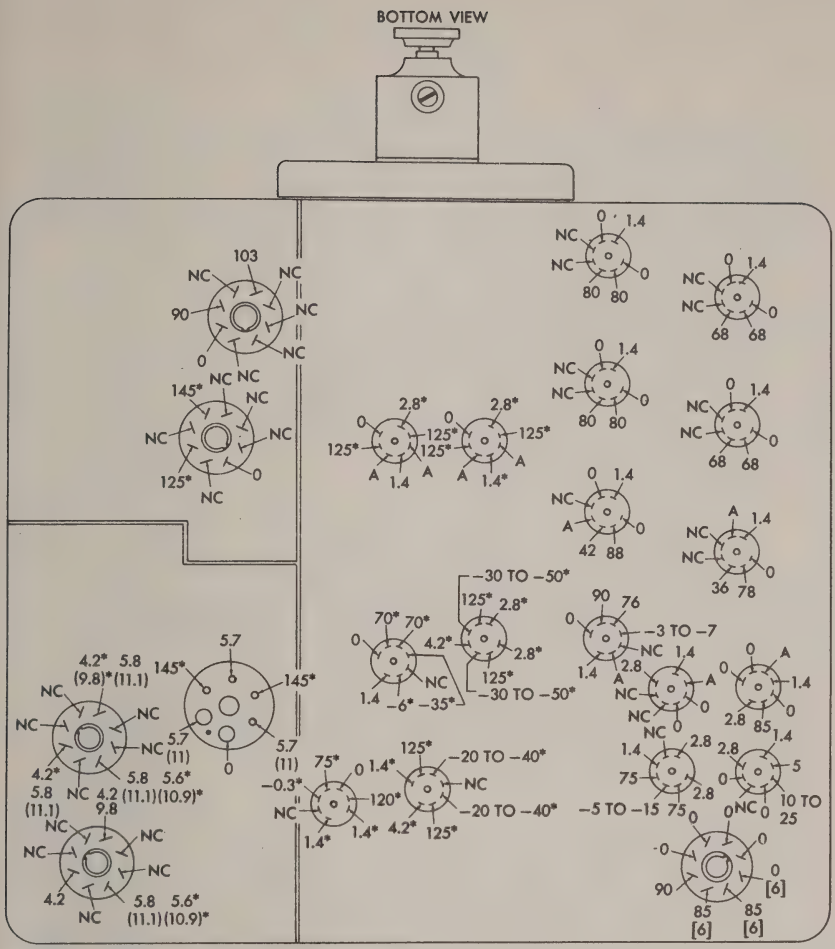
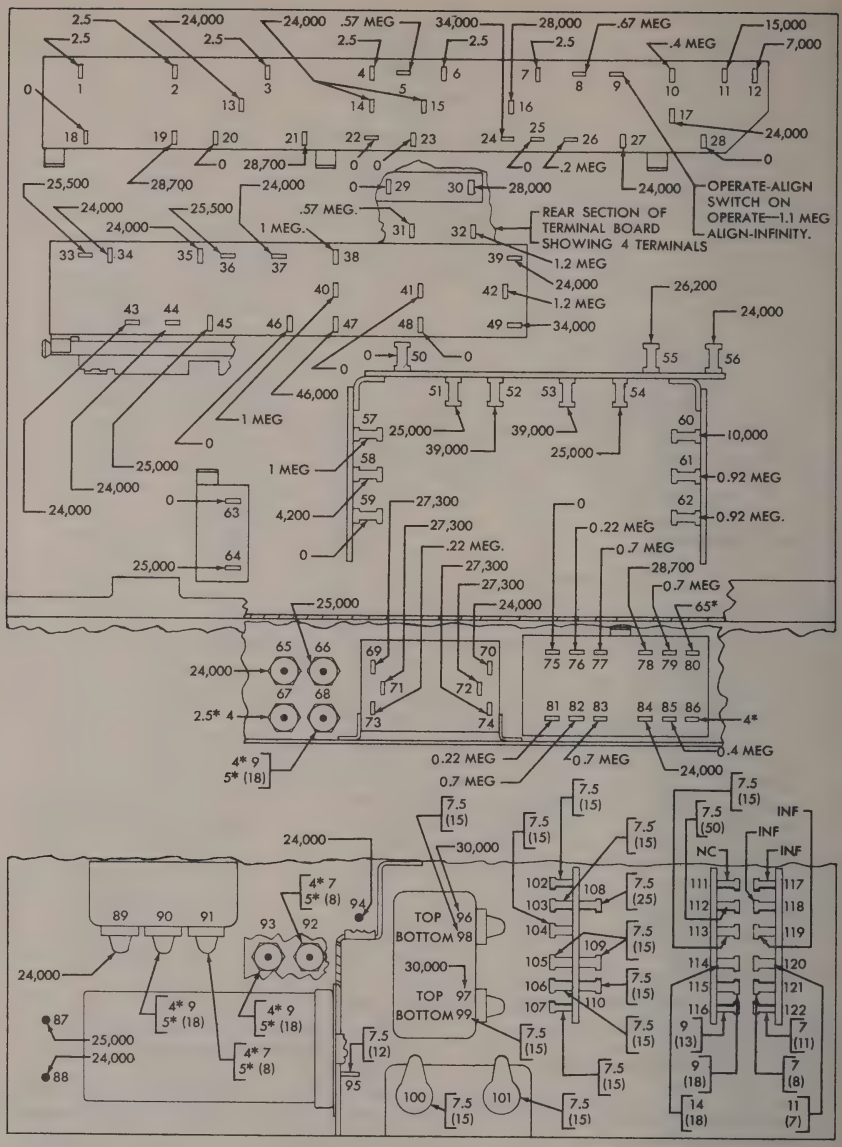


Figure 46. Tube socket voltage diagram, bottom view, taken with 1,000 ohms-per-volt voltmeter.



Unless otherwise noted, readings are made under the following conditions:

1. Transmitter switch in ALIGN-OTHERS position.
2. Test prod in holder.
3. ALIGN-OPERATE switch on OPERATE.
4. No antenna connected.
5. Press-to-talk switch not depressed.
6. ON-OFF switch off.
7. Set not connected to a voltage supply; 6-12-volt switch in 6-volt position.
8. Resistance measurements made to ground.

* Resistances read with press-to-talk switch depressed.
( ) Resistances read with 6-12-volt switch in 12-volt position.

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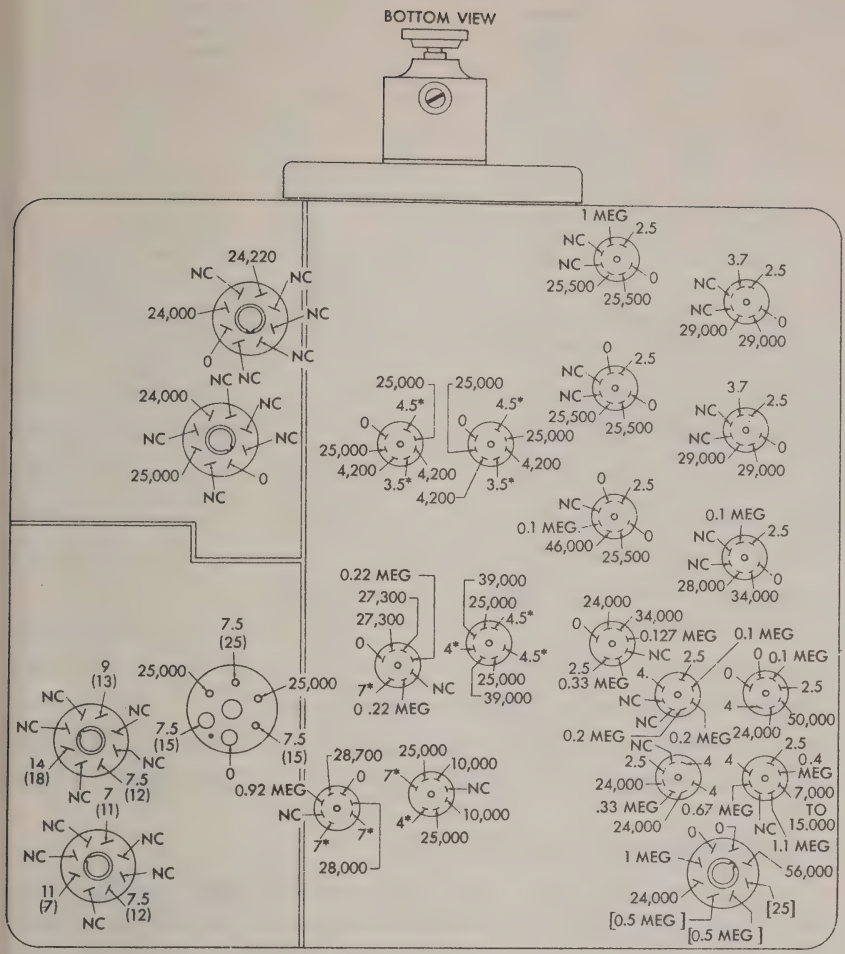
Figure 47. Terminal panel resistance diagram.



Unless otherwise noted, readings are made under the following conditions:

1. Transmitter switch in ALIGN-OTHERS position.
2. Test prod in holder.
3. ALIGN-OPERATE switch on OPERATE.
4. No antenna connected.
5. Press-to-talk switch not depressed.
6. ON-OFF switch off.
7. Set not connected to a voltage supply; 6-12-volt switch in 6-volt position.
8. Resistance measurements made to ground.

* Resistances read with press-to-talk switch depressed.

( ) Resistances read with 6-12-volt switch in 12-volt position.

[ ] Resistances read with ALIGN-OPERATE switch on ALIGN.

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Figure 48. Tube socket resistance diagram, bottom view.

Transformer	Primary resistance (ohms)	Secondary resistance (ohms)
T-1	8.5	1,000
T-2	3.6	3.6
T-3	3.6	3.6
T-4	3.6	3.6
T-5	3.6	2.4
T-6	810	460 (ground to No. 3)
		110 (ground to No. 4)
T-7	each less than 0.25	70 (No. 7 to No. 9)

All r-f coils except transmitter oscillator.....less than 0.2 ohm
Transmitter oscillator coils L-11, L-12.....less than 0.2 ohm
L-28 bias oscillator coil.....50 ohms
L-30 filament circuit choke.....0.3 ohm
L-35 B + hum choke.....125 ohms
Large pie-wound r-f chokes
L-13, L-9, L-10 .....20 ohms
Small pie-wound r-f choke.....8 ohms
Solenoid chokes L-14, L-15 on resistor forms.....5.5 ohms
Solenoid chokes on resistor forms except L-14 and L-15..0.2 ohm
Hash choke L-31.....less than 0.1 ohm

90. VOLTAGE CHECKS AT TEST STRIP.

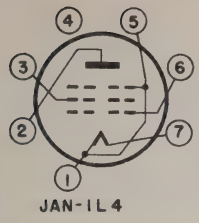
In these checks, use a signal generated by the receiver-transmitter as a test signal to produce voltages at the test strip pins. The value of this method depends largely on the repairman's ability to interpret results and their causes. Carry out each operation accurately, and check the cause of any variation carefully.

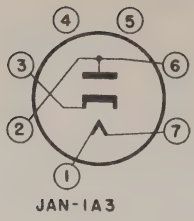
a. Connect the receiver-transmitter to a fully charged battery with Cord CD-1294.

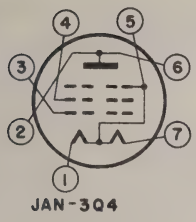
b. Remove antenna and plug in Headset HS-30-U and Microphone T-17.

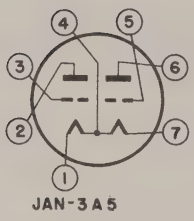
c. Turn the VOLUME control to the maximum clockwise position. A loud rushing noise should be heard in the headset.

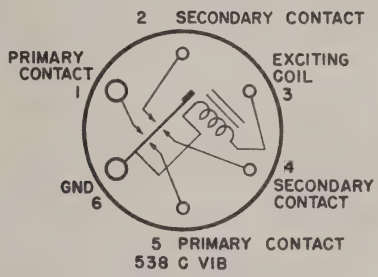
d. The following voltages should be present at test strip pins with no carrier signal being received, and with the transmitter switch on ALIGN OTHERS. (Use an electronic voltmeter for measuring these voltages.)

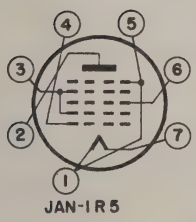


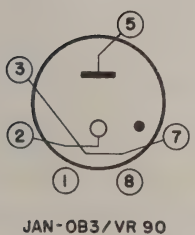












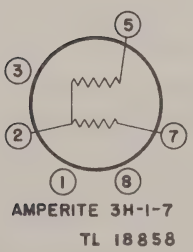


Figure 49. Tube base connections, bottom view.

Pin No.	Voltage to Ground
1	−3 to −10
2	−10 to −15
5A	−.4 to −1.0
5B	−3.8 to −4.8
5C	+10 to +70
6	0

e. Depress the press-to-talk switch and check the voltages at the test strip with an electronic voltmeter. The following voltages should be present:

Pin No.	Voltage to Ground
1	−3 to −10
2	−10 to −15
5A	−15 to −20
5B	−3.8 to −4.8
5C	−4 (with proper presetting)
6	−25 to −35

f. When the stage which is causing the trouble has been located, use resistance and voltage measurements to determine the circuit element at fault. Information in paragraph 88 will help to make resistance and voltage checks.

91. NOISE SUPPRESSION.

If excessive radio noise interference by the vehicle is heard on Radio Set SCR-619, refer to the maintenance manual furnished with the vehicle for a detailed description of the noise suppression system. Locate the noise source as follows:

a. Place the receiver-transmitter in operation with VOLUME control turned fully clockwise. Start the vehicle motor and listen to the output with a headset. Do not reduce the VOLUME control from maximum unless a high noise level makes it necessary.

b. When appreciable noise level is heard on any channel, leave the CHANNEL switch on that channel and turn off the vehicle ignition switch. That part of the noise which stops when the switch is turned off is caused by the ignition. Noise which lingers after the switch is turned off until the motor comes to rest is caused by the voltage regulator or the generator. Auxiliary equipment, such as oil, fuel, and temperature gauges, fans, etc., should

be turned on and off or disconnected individually to sectionalize noises caused by them.

c. The noise, when traced to an electrical circuit, often can be eliminated by improving the grounding of the case of the unit. Clean the surface under the cases and under all bonding straps and tighten the mounting bolts firmly. Clean and tighten wiring connections. If excessive noise remains, check the suppression components by substituting components of the same type and number.

SECTION XIII. REPAIRS

92. GENERAL.

Only competent personnel supplied with adequate tools and instruments are authorized to service and repair this equipment. An inexperienced operator attempting to make repairs which should be made by a competent repairman may damage the equipment to such an extent that it has to be sent to a higher echelon for repair.

a. The removal and replacement of defective parts or circuit elements in this radio set are very difficult; take great care to avoid further damage to the set or new part being installed. Before attempting repairs, make every effort to obtain proper tools for the job.

b. Often it may be necessary to remove other circuit elements to gain access to the defective part. Make a record of the connections to each element removed, and its position in the set.

c. Clip all leads as short as possible and avoid using more solder than necessary to make a secure connection. **The slightest amount of solder dropped accidentally inside the set can cause short circuits.** Exercise extreme care when soldering. Do not heat lugs or connections more than is absolutely necessary. Excessive heat damages near-by chokes, capacitors, coil forms, and wiring. When connecting a wire to a tube socket, use a wire long enough to prevent pull on the socket. Before removing a part that appears to be defective, make a thorough electrical check.

CAUTION: Never change the location of parts or wiring leads, as undesirable feedback and oscillations may result.

d. Exercise utmost care in disassembling and reassembling mechanical units. Secure bolts snugly, but do not overtighten them. Several illustrations (figs. 39, 40, 41, and 42) are provided for reference in replacing mechanical parts in Receiver-Transmitter BC-1335.

93. HANDLING OF TOOLS.

Careful handling of tools is essential in maintenance of signal equipment. Grasp tools firmly. Do not drop or jar them against breakable parts of the set. A tool dropped on the chassis of Receiver-Transmitter BC-1335 may damage tubes, resistors, or other delicate components. Do not strain wires, cables, connections, or couplings unnecessarily. Do not provide space for working on a part by carelessly pushing aside other parts that are in the way.

a. Care of Tools. Work can be performed rapidly and efficiently with well-kept tools. When a job has been completed, wipe the tools with a cloth slightly dampened with oil. Occasionally oil the hinge rivets of pliers and similar tools to keep them working freely. Inspect the handles of driving tools to see that they are tight and free from chips and splinters. When tools are to be stored for a long time, cover the surfaces with Grease, Lubricating, Special (GL) as a preservative. Do not use thin oil because its tendency to break down may permit moisture to corrode or rust the metal.

b. Construction of Special Maintenance Tools. The mechanical compactness of Receiver-Transmitter BC-1335 makes it difficult

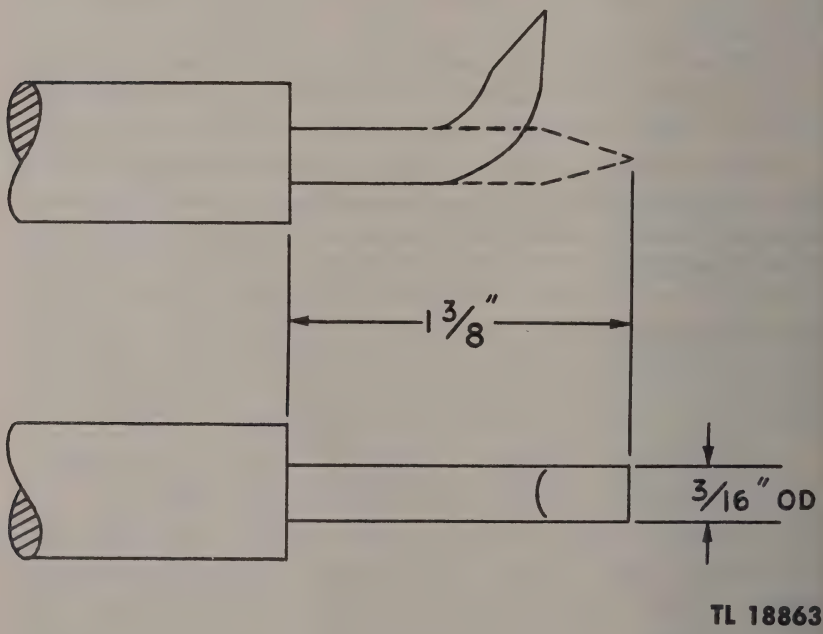


Figure 50. Modified soldering iron tip.

to solder and unsolder certain parts. To perform soldering operations with ease at close quarters, reshape a standard size soldering iron tip to chisel point and bend as illustrated by solid lines (fig. 50).

94. REPLACEMENT OF PARTS.

a. Tube Checking and Replacement. Locate the defective tube by replacing each tube (one at a time) with tubes known to be in good condition. Replace the original tube in each instance if the substituted tube does not correct the trouble. **Do not replace tubes unless they are defective.** To remove a tube shield, twist it slightly to the left and lift off. To replace a tube shield, place the shield over the tube, line up the slots, press the tube shield down, and twist it to the right to lock it in place. Tube shields **must** be replaced because they prevent interaction between circuits and help hold the tubes in their sockets. Burned-out tubes can also be located by checking continuity of filament circuits, but never use the lowest scale on the ohmmeter as tubes may burn out in testing. Examine tubes carefully for cracks in the glass, particularly around pins.

> **NOTE:** If the set has failed with 12-volt operation, it is possible that more than one tube in the transmitter section is burned out. Do not use the substitution method of checking tubes in the transmitter section with the receiver-transmitter connected to a 12-volt power source. Check all transmitter tubes in the receiver section **before** depressing the press-to-talk switch. **Failure to observe this precaution may burn out good tubes.**

b. Coils. Replacement of coils in Receiver-Transmitter BC-1335 presents no problem because all coils are mounted by bolts, nuts, and screws. In most installations the nuts are spun into the chassis, making it unnecessary to hold the nuts while turning the screws. If tuned circuit coils are replaced, the alignment and calibration procedure (sec. XIV) must be followed after replacement, at least that part concerned with adjustments on the replaced item.

c. Capacitors. The metal-encased bypass capacitors are replaced by removing the mounting screw from the bottom of the chassis and unsoldering the leads. Other capacitors are held by their leads only.

d. Sockets. Replacement of sockets presents no problem as they are held to the chassis base with machine screws, washers, and nuts.

e. Counters. Counters and their cover plates of SETTING NO. 1 through NO. 6 are held in place with four screws (fig. 51). In replacing counters, carefully note the reading of the ones removed and set the replacements to these readings before assembling on tops of the coils. Make sure that washers and tongued bushings are placed on the threaded core inserts in the order shown before assembly. The parts may fall off if the set is turned over.

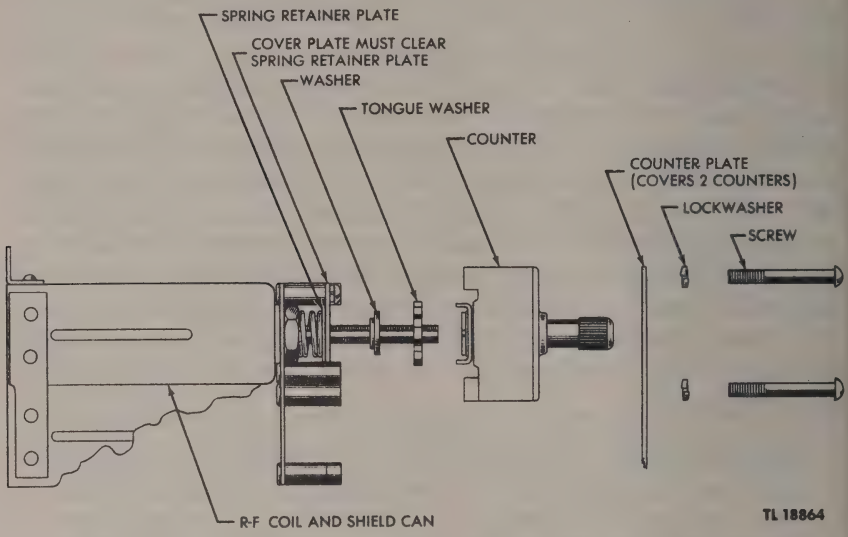


Figure 51. Counters on r-f coils, assembly.

f. Controls. When replacing controls on the front panel (VOLUME control R-31, 6V-12V switch S-5, or CHANNEL switch S-2) the rubber gasket must be placed in the cap provided (fig. 52). The rubber gasket must be resilient and free from cuts to eliminate water leakage. The controls are held to the panel by hexagonal nuts tightened from the front of the panel. To remove the CHANNEL switch, first remove the shield mounted on top of the switch. This requires the removal of seven connections to C-12, C-61, C-58, and BT-1. Then remove the No. 4 screws securing the switch to chassis posts, and disconnect the wires to S-2. Removal of the panel nut on the control shaft allows the switch to be removed.

g. Test Strip J-4. Major repairs on J-4 require removal of CHANNEL switch S-2. Minor repairs can be made by unscrewing the three mounting screws from the top of the chassis and pulling test strip J-4 a short distance upward. The nuts for these screws are fastened to the chassis and will not be lost when the screws are removed.

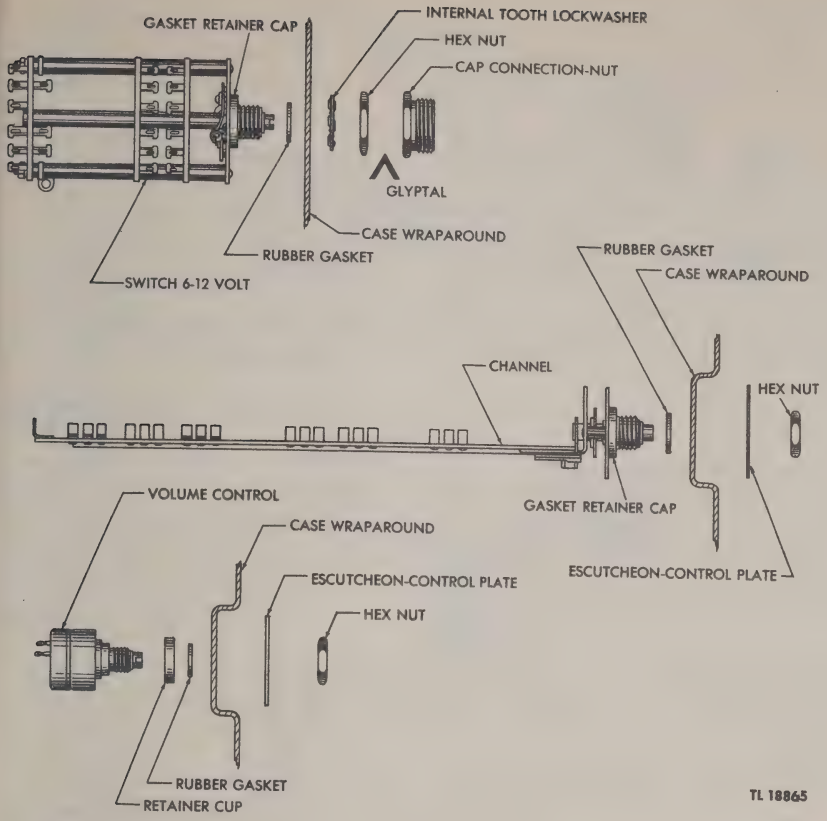


Figure 52. Watersealed control shaft assembly.

h. Jack Water Seals. Remove jack water seals by removing the nut on the jack bushing inside the water-seal housing. Remove the rubber cap by first removing the retainer spring. Figure 53 shows the assembly. Make sure the rubber washers are in the position shown when reassembling. If J-3 is to be removed, all three water seals are removed and jack strip J-3 can be removed from the back of the front panel. In replacing, make sure that the rubber boot is evenly overlapping the edge of the metal jack mounting strip when the nuts in the water-seal assemblies are tightened.

i. 6V-12V Switch. To replace the 6V-12V switch remove the locknut and nut from the bushing and two screws mounting the supporting brackets at the rear of the switch. Disconnect all wires. If difficulty is encountered in removing or installing the switch, the nuts on the rear of S-5C can be removed and the wafers tilted slightly and very carefully so that the switch contacts will not be damaged or bent out of shape.

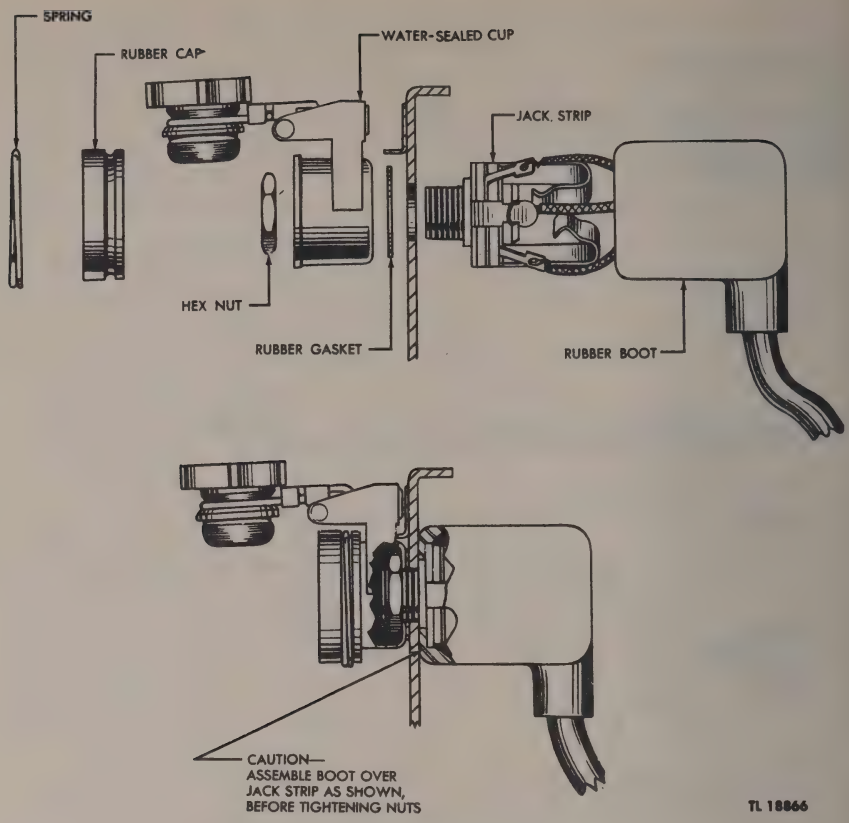


Figure 53. Jack water seals, assembly.

j. Antenna Post. There is no problem in repairing the antenna post. The only precaution is that the rubber gaskets must be in good condition and placed between the antenna post and the insulator, and between the insulator and the case.

k. R-f Chokes. In replacing pie-wound r-f chokes, the repairman will find a red dot on one end. This marks the inside lead to the choke. The wire on this end should never be connected to a terminal board. The unmarked end always connects to a terminal board connection.

95. RUSTPROOFING AND REPAINTING.

a. If the finish on the case is badly scarred or damaged, the repairman should touch up the exposed surfaces to prevent rust and corrosion. Using #00 or #000 sandpaper, clean the surface down to the bare metal until the finish is bright and smooth. Apply paint with a small brush.

CAUTION: The use of steel wool is not recommended. Although it removes rust rapidly, the small particles of metal which often fall into the case cause internal electrical shorting or grounding of circuits.

b. If a complete repainting job is necessary, proceed as follows:

(1) Loosen rust and corrosion with dry-cleaning solvent (SD).

(2) Using #00 or #000 sandpaper, clean the surface down to the bare metal until the finish is bright and smooth.

(3) Spray-paint the entire case using a paint which is authorized by existing regulations.

96. UNSATISFACTORY EQUIPMENT REPORT.

a. When trouble in equipment used by Army Ground Forces or Army Service Forces occurs more often than repair personnel feel is normal, War Department Unsatisfactory Equipment Report, W.D., A.G.O. Form No. 468 should be filled out and forwarded through channels to the Office of the Chief Signal Officer, Washington 25, D. C.

b. When trouble in equipment used by Army Air Forces occurs more often than repair personnel feel is normal, Army Air Forces Form No. 54 should be filled out and forwarded through channels.

c. If either form is not available, prepare the data according to the sample form reproduced in figure 54.

SECTION XIV. ALIGNMENT AND ADJUSTMENT

CAUTION: Only trained repair personnel authorized to perform such work in units furnished with the necessary special items of equipment may adjust i-f stages, discriminator, transmitter oscillator, crystal oscillator amplifier or neutralizing trimmers. Many sets turned in for repair are inoperative only because of *unauthorized tampering* with these trimmers.

97. TEST INSTRUMENTS.

The following test equipment should be used for alignment and adjustment of Receiver-Transmitter BC-1335:

a. An electronic voltmeter for measuring voltages at the metering socket and discriminator test points, which may be:

(1) Voltohmmeter I-107-( ) part of Maintenance Equipment ME-13-( ). Refer to TM 11-306.

WAR DEPARTMENT

UNSATISFACTORY EQUIPMENT REPORT

FOR	TECHNICAL SERVICE: Signal Corps — MATERIEL		DATE: 1 Feb 45
FROM	ORGANIZATION: 175 Signal Repair Co.		STATION: APO 102
TO	NEXT SUPERIOR HEADQUARTERS: Supply Sec. Hq Fourth Army Sig Sv.	STATION: APO 110	TECHNICAL SERVICE: Signal Corps

COMPLETE MAJOR ITEM

NOMENCLATURE	TYPE	MODEL
Radio Transmitter BC-123-A	Ground, vehicular	A

MANUFACTURER	U. S. A. REG. NO.	SERIAL NO.	DATE RECEIVED
American Radio Corp	Order No. 1234-Phila-45	12345	5 Jan 45

EQUIPMENT WITH WHICH USED (*If applicable*): Radio Set SCR-456-A — Tank, Medium, M4

DEFECTIVE COMPONENT—DESCRIPTION AND CAUSE OF TROUBLE

PART NO.	TYPE	MANUFACTURER	DATE INSTALLED
Stk. No. 3E47-2	Capacitor C20: fixed; 1-mf; 500 vdcw	American Radio Corp	when manufactured

DESCRIPTION OF FAILURE AND PROBABLE CAUSE (*If additional space is required, use back of form*)

Capacitor C20 shorts out due to humid operating conditions

DATE OF INITIAL TROUBLE	TOTAL TIME INSTALLED			TOTAL PERIOD OF OPERATION BEFORE FAILURE					
	YEARS	MONTHS	DAYS	YEARS	MONTHS	DAYS	HOURS	MILES	ROUNDS
15 Jan 45	-	-	-	0	0	5		-	-

BRIEF DESCRIPTION OF UNUSUAL SERVICE CONDITIONS AND ANY REMEDIAL ACTION TAKEN

Operation in tropics; heavy rainfall. Was replaced and set given moistureproofing and fungiproofing treatment, 20 Jan 45.

TRAINING OR SKILL OF USING PERSONNEL			RECOMMENDATIONS (*If additional space is required, use back of form*)
POOR	FAIR	GOOD	
		X	Substitute capacitor designed for tropical operation

ORIGINATING OFFICER

TYPED NAME, GRADE, AND ORGANIZATION	SIGNATURE
E. A. WILSON, 1st Lt., Sig C. 175 Sig Repair Co.	E. A. Wilson

FIRST ENDORSEMENT

TO CHIEF	TECHNICAL SERVICE	OFFICE	
NAME, GRADE, AND STATION		STATION	DATE

Instructions

1. It is imperative that the chief of technical service concerned be advised at the earliest practical moment of any constructional, design, or operational defect in matériel. This form is designed to facilitate such reports and to provide a uniform method of submitting the required data.
2. This form will be used for reporting manufacturing, design, or operational defects in matériel, petroleum fuels, lubricants, and preserving materials with a view to improving and correcting such defects, and for use in recommending modifications of matériel.
3. This form will not be used for reporting failures, isolated material defects or malfunctions of matériel resulting from fair-wear-and-tear or accidental damage nor for the replacement, repair or the issue of parts and equipment. It does not replace currently authorized operational or performance records.
4. Reports of malfunctions and accidents involving ammunition will continue to be submitted as directed in the manner described in AR 750-10 (change No. 3).
5. It will not be practicable or desirable in all cases to fill all blank spaces of the report. However, the report should be as complete as possible in order to expedite necessary corrective action. Additional pertinent information not provided for in the blank spaces should be submitted as inclosures to the form. Photographs, sketches, or other illustrative material are highly desirable.
6. When cases arise where it is necessary to communicate with a chief of service in order to assure safety to personnel, more expeditious means of communication are authorized. This form should be used to confirm reports made by more expeditious means.
7. This form will be made out in triplicate by using or service organization. Two copies will be forwarded direct to the technical service; one copy will be forwarded through command channels.
8. Necessity for using this form will be determined by the using or service troops.

W. D., A. G. O. Form No. 468
30 August 1944

This form supersedes W. D., A. G. O. Form No. 468, 1 December 1943, which may be used until existing stocks are exhausted.

TL19589

U. S. GOVERNMENT PRINTING OFFICE 16—41546-1

Figure 54. W.D., A.G.O. Form No. 468, sample form.

(2) The test circuit of Receiver-Transmitter BC-1335 in conjunction with OPERATE-ALIGN switch, and with a 4- to 8-volt battery and a test prod.

(3) Any other electronic voltmeter.

b. Alignment tool, part of Maintenance Equipment ME-13-( ).

c. A means of generating a signal at the i-f of 4.3 mc, such as Oscillator VO-4-( ) part of Maintenance Equipment ME-13-( ) or a 4.3-mc crystal, in Crystal Holder FT-243 which is used in the receiver oscillator socket. This crystal may be obtained from Maintenance Equipment ME-13-( ).

98. ALIGNMENT OF RECEIVER I-F AMPLIFIER AND DISCRIMINATOR USING MAINTENANCE EQUIPMENT ME-13-( ).

a. Set up the equipment as follows:

(1) Remove covers of the receiver-transmitter by unfastening catch-clips around edge of cover, and removing 12 screws around edge of bottom.

(2) Set transmitter switch to ALIGN 5 AND 6.

(3) Connect receiver-transmitter to its power source by joining with Cord CD-1294 or Cordage CO-134 (modified) (TM 11-619).

(4) Remove both crystals from the set.

b. Align using the following procedure:

NOTE: Maintenance Equipment ME-13-( ) is based on use of Voltohmmeter I-107-( ) as an indicator. However, any other electronic voltmeter serves equally well.

(1) Set up and calibrate Voltohmmeter I-107-( ) as indicated in TM 11-306. Connect the common-lead alligator clip to the case or chassis of the receiver-transmitter.

(2) Set up Oscillator VO-4-( ) as indicated in TM 11-306 and set its switch to 4.3 mc. Turn ATTENUATION control clockwise only enough to turn Oscillator VO-4-( ) on.

NOTE: During i-f alignment, reduce the output of Oscillator VO-4-( ), whenever possible, by turning the ATTENUATION control still farther to the right. **Work with as weak a signal as possible.** At each adjustment reduce the input until voltage on the voltmeter is not more than 1 volt whenever possible and in no case more than twice the voltage read with Oscillator VO-4-( ) turned off.

(3) Turn receiver-transmitter on with the VOLUME control. **Do not connect the microphone.**

(4) Connect the ungrounded lead of Oscillator VO-4-( ) to pin No. 6 of mixer Tube JAN-1R5 (V-8) (fig. 56).

(5) Loosen locknuts on top and bottom adjustments on transformers T-2, T-3, and T-4 just enough so that a slight drag is felt when the adjustment screw is turned. Remove top and bottom caps on discriminator transformer T-5 and loosen locknut under bottom cap with screwdriver. Then insert alignment screwdriver in the hole in the locknut for adjustment of the secondary of transformer T-5. The locknut should be just tight enough to cause a slight drag on the adjusting screw.

(6) Insert meter probe in pin No. 5-A of test strip J-4. Adjust secondary (bottom) and primary (top) of i-f transformer T-4, T-3, and T-2 for maximum voltage on Voltohmmeter I-107-( ) (figs 55 and 56).

NOTE: In an emergency, when Oscillator VO-4-( ) is not available, this adjustment can be made by plugging a 4.3-mc crystal in Crystal Holder FT-243 into the receiver-transmitter crystal socket. With the crystal on the A or B side, throw the CHANNEL switch to the corresponding position. Since no attenuation is provided in this arrangement, too much signal is supplied for accurate adjustment of the i-f amplifier. **Alway use Oscillator VO-4-( ) when available.**

(7) Readjust primary and secondary of transformers T-2, T-3, and T-4. I-f amplifier is now aligned.

(8) Connect voltmeter probe to discriminator test point (fig. 56). Using full output of Oscillator VO-4-( ) and lowest range of voltmeter, adjust secondary (bottom adjustment) of discriminator transformer T-5 (fig. 56) for 0 volts.

NOTE: If Oscillator VO-4( ) is not available, a 4.3-mc crystal may be used in the receiver-transmitter crystal socket as in subparagraph b(6) above. In this case the accuracy of adjustment is not as good as that obtained by use of test Ocillator VO-4-( ).

(9) Connect voltmeter probe to center tap of secondary of transformer T-5 (fig. 56), and adjust primary of transformer T-5 for maximum voltage on Voltohmmeter I-107-( ) with no signal input from Oscillator VO-4-( ).

(10) Check secondary of T-5 as in subparagraph (8) above; readjust to zero if necessary. Discriminator is now aligned. Tighten locknuts on T-2, T-3, T-4, and secondary of T-5, being careful not to disturb the adjustment. Replace top sealing cap on T-5. Heat T-5 for 1 to 3 minutes with a soldering iron held close to the metal shield from the top of the chassis, and replace bottom sealing cap.

(11) Turn off set.

99. CALIBRATION AND NEUTRALIZATION USING MAINTENANCE EQUIPMENT ME-13-( ).

a. Place two crystals for channel 328 in the crystal holders for channels A and B, and throw transmitter switch to ALIGN 5 AND 6. If only one crystal for channel 328 is available, plug it alternately into A or B as indicated by the position of the CHANNEL switch in the following steps.

b. Remove counters from all r-f coils, SETTING NO. 1 through NO. 6. Do not remove keyed bushings or washers under them (fig. 51).

Figure 55. Receiver-Transmitter BC-1335, top view, alignment adjustments.

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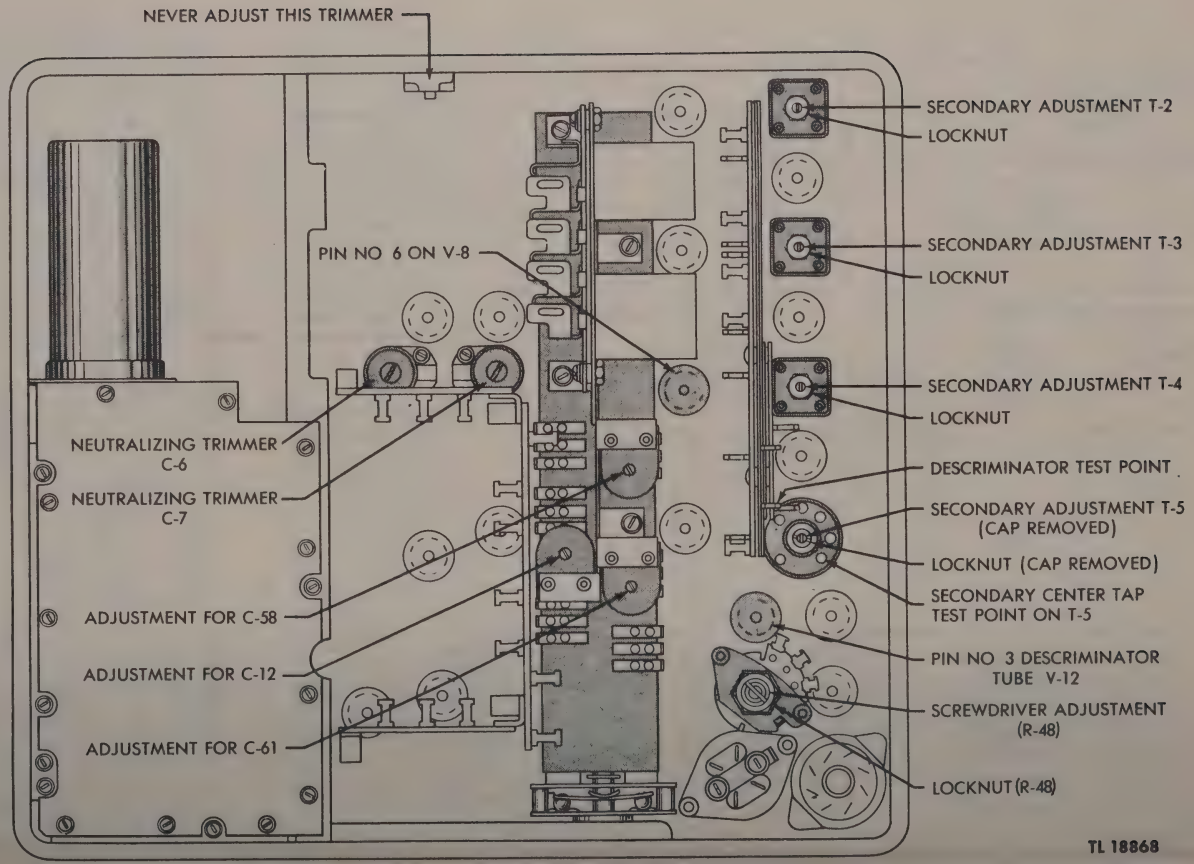

Figure 56. Receiver-Transmitter BC-1335, bottom view, alignment adjustments.

c. Back out all r-f adjusting screws until the stop is reached. **Do not force these screws as this may strip threads.**

d. Turn set on with VOLUME control and throw CHANNEL switch to channel A. Place test prod of Voltohmmeter I-107-( ) in pin No. 1 of test strip J-4 and adjust C-61 (fig. 56) for maximum reading. Repeat with CHANNEL switch thrown to channel B. If these two positions of C-61 do not fall at the same point, place C-61 halfway between the two peaks.

e. Place test prod of Voltohmmeter I-107-( ) in pin No. 2 of J-4 and adjust C-58 (fig. 56) for maximum reading on both channels. The final adjustment is halfway between these points if they are not the same.

f. Insert microphone plug in J-3A and depress press-to-talk switch. Connect Voltohmmeter I-107-( ) to pin No. 5-A on J-4, and adjust C-12 (fig. 56) for maximum reading (this will be at least 12 volts). Several peaks may be noted in making this adjustment. It is important that the largest one be selected. Throw the CHANNEL switch and repeat. The final adjustment of C-12 is halfway between these two points if they are not the same.

g. At this point, if neutralizing trimmers C-6 and C-7 have been changed accidentally, readjust them. Do not make this adjustment unless trimmers C-6 and C-7 have been changed. Perform operations (1) to (4) below to determine whether neutralization is necessary.

(1) Plug crystal for channel 389 into crystal holder A. Throw CHANNEL switch to A and adjust SETTING NO. 1A for maximum voltage at pin No. 1 on J-4, and SETTING NO. 2A for maximum voltage at pin No. 2 on J-4. Use Voltohmmeter I-107-( ) for voltage indications.

(2) Depress the press-to-talk switch and adjust SETTING NO. 5A for maximum voltage at pin No. 5A on test strip J-4 (this will be at least 12 volts). Several peaks may be noticed. Select the highest peak.

(3) Depress the press-to-talk switch and adjust SETTING NO. 6A for maximum voltage at pin No. 6 on J-4.

(4) Depress the press-to-talk switch. Rotate SETTING NO. 7A slowly, and carefully notice reading on Voltohmmeter I-107-( ). If it dips more than one division for any adjustment on SETTING NO. 7A, the set requires neutralization.

(5) To neutralize, adjust capacitors C-6 and C-7 equally in small steps (fig. 56). Use a screwdriver and check between adjustments for dip as in subparagraph g(4) above until the dip is less than one division. Settings of C-6 and C-7 must be kept approximately equal. Check by observing the angle of the screwdriver slots.

NOTE: Remove screwdriver from capacitor C-6 or C-7 when making this check and retune SETTING No. 6 after each adjustment of C-6 and C-7.

h. Ground lug 3 on discriminator V-12. Turn set on. place probe of Voltohmmeter I-107-( ) in pin No. 5-C on test strip. Slightly loosen the locknut on R-48 (fig. 56), depress press-to-talk switch and adjust this variable resistor with a screwdriver until Voltohmmeter I-107-( ) indicates 4.0-volts NEGATIVE voltage. Tighten locknut on R-48. Remove ground connection on lug 3 of V-12.

i. Turn set off. Plug two crystals for channel 301 into the set. If only one crystal for channel 301 is available, plug it alternately into A or B as indicated by the position of the CHANNEL switch in the following steps. Turn all adjustment screws for SETTING NO. 1 and NO. 6 until only ¼ inch to ⅜ inch of the screw extends above the plates on top of the coils. Be sure tongue bushings and washers are in proper position (fig. 51).

j. Turn set on. Place test probe of Voltohmmeter I-107-( ) in pin No. 1 on test strip J-4. Throw CHANNEL switch to A. Back out r-f screw in SETTING NO. 1A for maximum reading. Throw switch to channel B. Back out r-f adjusting SETTING NO. 1B for maximum indication. Place probe of Voltohmmeter I-107-( ) in pin No. 2 on test trip J-4 and back out r-f adjusting screw on SETTING NO. 2B for maximum indication. Throw CHANNEL switch to channel A and back out r-f adjusting screw on SETTING NO. 2A for maximum indication.

k. Thow transmitter switch to ALIGN 5 AND 6. Place probe of Voltohmmeter I-107-( ) in pin No. 5-A of test strip J-4. Depress microphone press-to-talk switch. Back out r-f adjustment screw on SETTING NO. 5A for maximum indication on Voltohmmeter I-107-( ). This voltage will be at least 12 volts. Throw CHANNEL switch to channel B and repeat above adjustment, using r-f adjustment screw in B setting. Several peaks may be noticed. It is important to select the first large one (over 12 volts) as the adjusting screw is backed out. The screws on SETTING

NO. 5A and NO. 5B will now be in approximately the same position as the screw position on SETTING NO. 1 and NO. 2 as determined above.

l. Place probe of Voltohmmeter I-107-( ) in pin No. 6 of test strip J-4 and depress microphone press-to-talk switch. Back out r-f adjustment screw in SETTING NO. 6A for maximum indication. Throw CHANNEL switch to A and repeat using adjustment screw in SETTING No. 6A. Throw transmitter switch on ALIGN OTHERS, and back out r-f adjustment screw on SETTING NO. 3A and NO. 4A, and adjust SETTING NO. 7A for maximum noise in headset. Throw CHANNEL switch to B and adjust SETTING NO. 3B, NO. 4B, and NO. 7A as above.

m. Set all counters to I-6 and install (fig. 51). Make sure they operate freely and without binding. Be sure that counters labeled A are in the proper position as indicated by the illustration in the top cover of Receiver-Transmitter BC-1335 or in figure 58.

100. ALIGNMENT OF RECEIVER I-F AMPLIFIER AND DISCRIMINATOR, USING TEST CIRCUIT.

a. Set up the equipment as follows:

(1) Remove covers of the receiver-transmitter by unfastening catch-clips around edge of top cover, and removing 12 screws around edge of bottom cover.

(2) Set transmitter switch to ALIGN 5 and 6.

(3) Connect receiver-transmitter to its power source with Cord CD-1294 or Cordage CO-134 (modified).

(4) Remove both crystals from the set.

b. Align using the following procedure:

(1) Thow alignment switch (fig. 55) to ALIGN. Remove test prod from its holder and plug it into pin No. 5A on test strip J-4.

(2) Set up Oscillator VO-4-( ) as indicated in TM 11-306 and set its switch to 4.3 mc. Turn ATTENUATION control clockwise only enough to turn on Oscillator VO-4-( ).

(3) Turn receiver-transmitter on with VOLUME control, turning the control for maximum clockwise rotation. **Do not connect the microphone.**

(4) Connect the ungrounded lead of Oscillator VO-4-( ) to pin No. 6 of mixer Tube JAN-1R5 (V-8) (fig. 56).

(5) Loosen locknuts on top and bottom adjustments on T-2, T-3, and T-4 just enough so that a slight drag is felt when the adjustment screw is turned. Remove top and bottom caps on discriminator transformer T-5, and loosen locknut under bottom cap with screwdriver. Then insert alignment screwdriver in the hole in the locknut for adjustment of the secondary of T-5. The locknut should be just tight enough to cause a slight drag on the adjusting screw.

(6) Adjust secondary (bottom) and primary (top) of i-f transformers T-4, T-3, and T-2 for maximum closure on eye tube V-18 (figs. 55 and 56). If the eye tube closes completely during this adjustment, reduce the input from Oscillator VO-4-( ) by turning the attenuator to the right. Only if the eye still closes with extreme clockwise rotation of attenuator on Oscillator VO-4-( ) may the receiver-transmitter VOLUME control be adjusted so the eye tube opens.

NOTE: In an emergency, when oscillator VO-4-( ) is not available, this adjustment can be made by plugging a 4.3-mc crystal in Crystal Holder FT-243 into the receiver-transmitter crystal socket. With the crystal on the A or B side, throw the CHANNEL switch to the corresponding position. Since no attenuation is provided in this arrangement, too much signal is supplied for accurate adjustment of the i-f amplifier. **Always use Oscillator VO-4-( ) when available.** The closure of the eye tube must be adjusted with the VOLUME control when using this emergency procedure.

(7) Readjust primary and secondary of T-2, T-3, and T-4. I-f amplifier is now aligned.

(8) Remove test prod from J-4 and connect to negative terminal of any convenient 4- to 8-volt battery. Connect a wire about 12 inches long to the positive terminal of the battery and connect a test prod to the other end (fig. 57). (Stripping the end of the wire will do in an emergency.) Do not solder to test prod. This will cause prod to bind in pins on J-4. Use clip as shown in figure 57. Connect this test prod to the receiver-transmitter case or chassis and adjust the VOLUME control for a hairline opening on eye tube V-18. Connect the wire or test prod from the test battery to pin No. 3 on discriminator tube V-12. Using full output from Oscillator VO-4-( ), adjust bottom of discriminator transformer T-5 until the eye tube again shows a hairline opening.

NOTE: If Oscillator VO-4-( ) is not available, a 4.3-mc crystal may be used in the receiver-transmitter crystal socket as in subparagraph b(6) above. In this case the accuracy of adjustment is as good as that obtained by use of test Oscillator VO-4-( ).

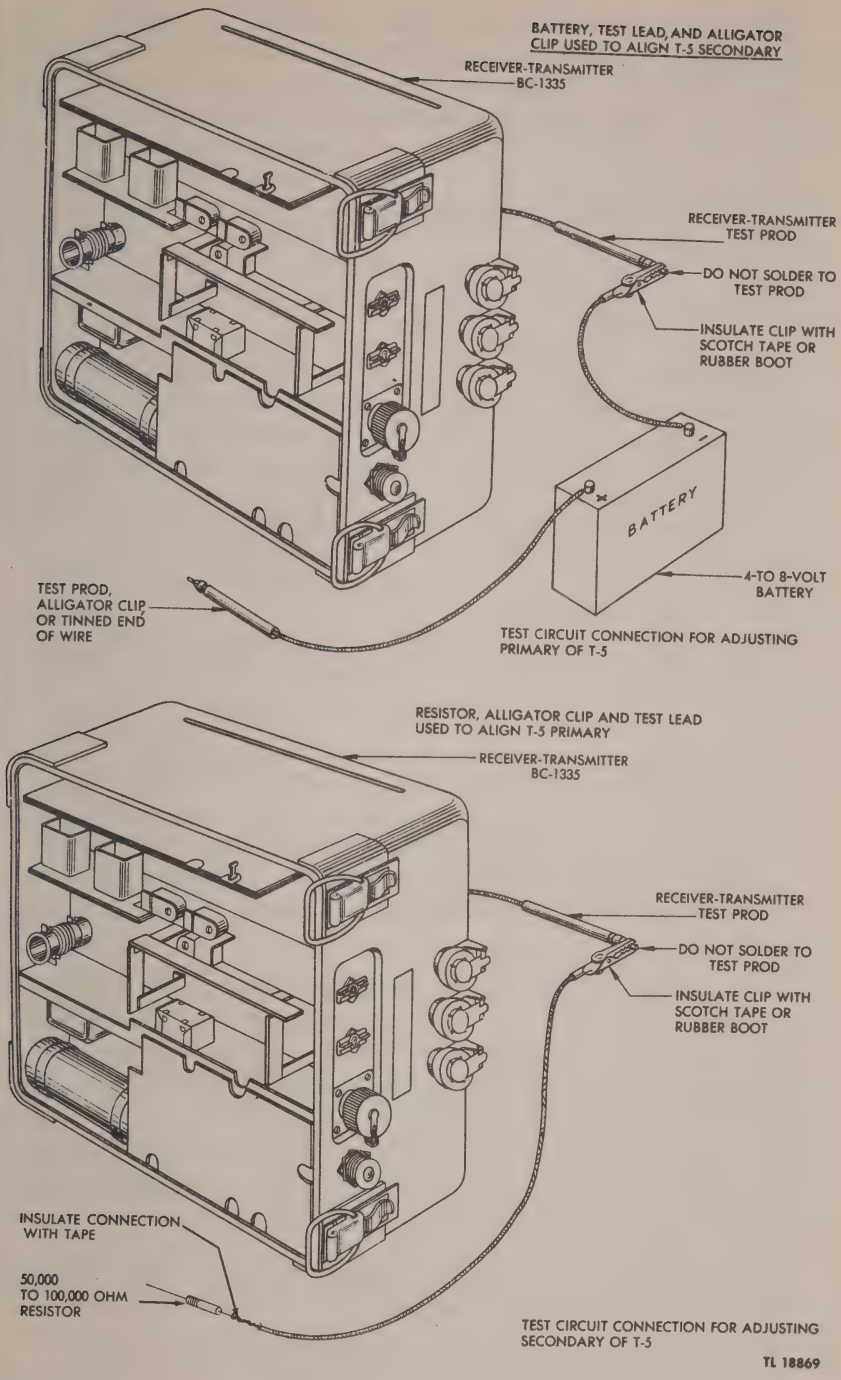

Figure 57. Adapters for using indicator eye tube in alignment.

(9) Select a convenient resistor between 50,000 and 100,000 ohms resistance and clip the lead from one end so that it is not more than ½ inch long. Connect a 12-inch flexible lead to test prod and to long lead from resistor. Tape all connections (fig. 57). Connect the short lead on resistor (using resistor as a test prod) to center tap on secondary of T-5. With no i-f signal input, adjust the primary tap of T-5 for maximum eye closure. Disconnect wire from test prod.

NOTE: Do not solder to test prod. This will cause prod to bind in pins on J-4. Use clips as shown in figure 57.

(10) Check secondary of T-5 as in subparagraph (8) above; readjust to zero if necessary. Discriminator is now aligned. Tighten locknuts on T-2, T-3, T-4, and secondary of T-5, being careful not to disturb the adjustment. Replace top sealing cap on T-5. Heat T-5 for 1 to 3 minutes with a soldering iron held close to the metal shield from the top of the chassis, and replace bottom sealing cap.

(11) Turn off set.

(12) Replace test prod in holder and throw ALIGN-OPERATE switch to OPERATE.

101. CALIBRATION USING TEST CIRCUITS IN RECEIVER-TRANSMITTER BC-1335.

CAUTION: Since it is not possible to accurately neutralize the receiver-transmitter without an electronic voltmeter, be careful not to touch the adjustment of trimmers C-6 and C-7 (fig. 56).

a. Place two crystals for channel 328 in the crystal holders for channels A and B, and throw transmitter switch to ALIGN 5 AND 6. If only one crystal for channel 328 is available, plug it alternately into A or B as indicated by the position of the CHANNEL switch in the following steps:

b. Remove counters from all r-f coils, SETTING NO. 1 through NO. 6. Do not remove keyed bushings or washers under the counters (fig. 51).

c. Back out all r-f adjusting screws until the stop is reached. **Do not force these screws as this may strip threads.**

d. Throw ALIGN-OPERATE switch to ALIGN.

e. Turn set on with VOLUME control and throw CHANNEL switch to channel A. Place test prod in pin No. 1 of test strip J-4

and adjust C-61 (fig. 56) for maximum eye closure. Eye sensitivity is controlled by the VOLUME control. Throw CHANNEL switch to B and readjust C-61 for maximum eye closure. If these two positions of C-61 do not fall at the same point, place C-61 halfway between the two peaks.

f. Place test prod in pin No. 2 of J-4 and adjust C-58 (fig. 56) for maximum eye closure on both channels. The final adjustment is halfway between these points if they are not the same.

g. Insert microphone plug in J-3A and depress press-to-talk switch. Plug test prod into pin No. 5-A on J-4, and slowly adjust C-12 (fig. 56) for maximum eye closure. Several peaks may be noted in making this adjustment. Select the largest peak. Throw the CHANNEL switch and repeat. The final adjustment of C-12 is halfway between these two points if they are not the same.

h. Turn off set. Plug two crystals for channel 301 into the set. If only one crystal for channel 301 is available, plug it alternately into A or B as indicated by the position of the CHANNEL switch in the following steps. Turn all adjustment screws for SETTING NO. 1 and NO 6 until only ¼ inch to ⅜ inch of the screw extends above the plates on top of the coils. Be sure tongue bushings and washers are in proper position (fig. 51). Do not mash threads with pliers.

i. Ground lug 3 on discriminator V-12. Turn on set. Depress press-to-talk switch. Place test prod in pin No. 5-B on test strip and adjust VOLUME control for hairline opening in eye tube V-18. Place test prod in pin 5-C and, without readjusting VOLUME control, slightly loosen the locknut on R-48 (fig. 56) and adjust this variable resistor with a screwdriver for hairline eye tube closure. Tighten locknut on R-48. Remove ground on lug 3 of V-12.

j. Place test probe in pin No. 1 on test strip J-4. Throw CHANNEL switch to A. Back out r-f adjusting screw in SETTING NO. 1A for maximum eye closure. Throw switch to channel B. Back out r-f adjusting screw on SETTING NO. 1B for maximum eye closure. Place probe in pin No. 2 on test strip J-4, and back out r-f adjusting screw on SETTING NO. 2B for maximum eye closure. Throw CHANNEL switch to channel A and back out r-f adjusting screw on SETTING NO. 2A for maximum eye closure.

k. Throw transmitter switch to ALIGN 5 AND 6. Place probe in pin No. 5-A of test strip J-4. Depress microphone press-to-talk switch. Back out r-f adjustment screw on SETTING NO. 5A for maximum eye closure. Throw CHANNEL switch to channel B

and repeat above adjustment, using r-f adjustment screw in B setting. Several peaks may be noticed. Select the first large peak as the adjusting screw is backout out. The screws on SETTING NO. 5A and 5B will now be in approximately the same position as the screw positions on SETTING NO. 1 and NO. 2 as determined above.

l. Place probe in pin No. 6 of test strip J-4 and depress microphone press-to-talk switch. Back out r-f adjustment screw in SETTING NO. 6A for maximum eye closure. Throw CHANNEL switch to A and repeat using adjustment screw in SETTING NO. 6A. Throw transmitter switch to ALIGN OTHERS and back out r-f adjustment screw on SETTING NO. 3A and NO. 4A, and adjust SETTING NO. 7A for maximum noise in headset. Throw CHANNEL switch to B and adjust SETTING NO. 3B, NO. 4B, and NO. 7B as above.

m. Set all counters to I-6 and install (fig. 51). Make sure they operate freely and without binding. Be sure that counters labeled A are in the proper position as indicated by the illustration in the top cover of Receiver-Transmitter BC-1335 or in figure 58.

102. PRELIMINARY INSTRUCTIONS.

CAUTION: Make sure that Receiver-Transmitter BC-1335 operates properly before attempting to change channel presettings. Remove antenna if attached.

a. Select crystals with the assigned channel numbers stamped on Crystal Holder FT-243. These are located in the spare crystal holder attached to the lid of the set or in Case CS-137. Release crystal holder clamp and remove crystals from set. Insert the new crystal assigned to A channel into the crystal socket marked A and insert new crystal assigned to B channel in crystal socket marked B. Replace crystal holder clamp over top of both crystals.

b. Find the assigned channels in the crystal chart and adjust all settings on both channels A and B to the values listed in the chart opposite the assigned channel numbers. The proper settings for channel A are marked opposite the A channel number and the proper settings for channel B are found opposite the "B" channel number.

NOTE: Counters on SETTING No. 1 through No. 6 are calibrated by numbers and letters seen through windows beside knobs labeled A and B on top of r-f coil metal shields (fig. 58). Numbers are on the inside, or smaller dial. The turning ratio is approximately 8 to 1, which means that eight numbers will pass the counter window before one letter is changed. Turn the knob either left or right, whichever is nearest the new setting.

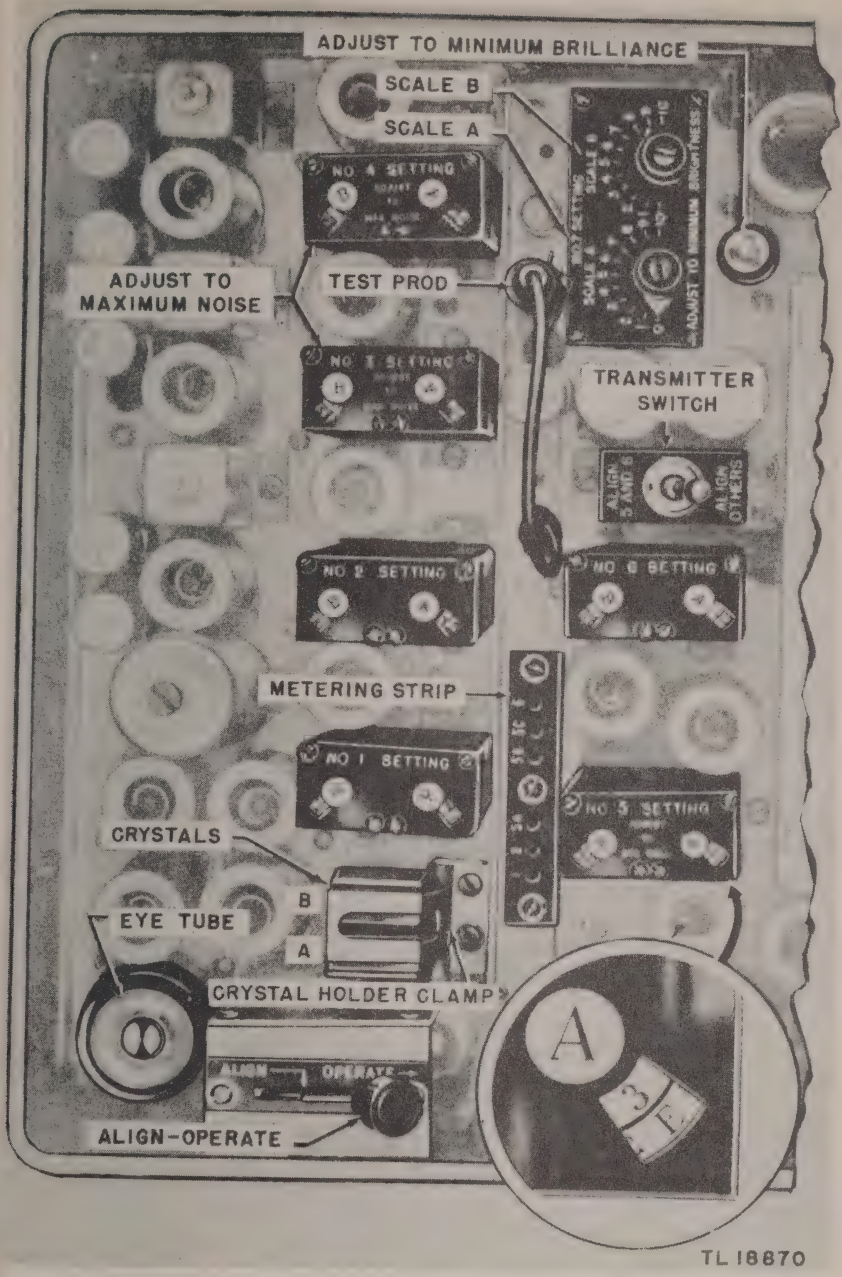

Figure 58. Receiver-Transmitter BC-1335, top view of chassis, components used in presetting.

103. PRESETTING CHART FOR TUNED RECEIVER AND TRANSMITTER CIRCUITS.

Channel frequency	SETTING NO.			Channel frequency	SETTING NO.		
	1, 2, 5	3, 4, 6	7		1, 2, 5	3, 4, 6	7
270	E-1	E-6	1.0	294	H-8	H-8	3.5
271	E-3	E-8	1.0	295	I-1	I-1	3.5
272	E-5	F-2	1.0	296	I-2	I-2	3.5
273	E-7	F-3	1.5	297	I-2	I-2	3.5
274	F-1	F-4	1.5	298	I-3	I-3	4.0
275	F-2	F-6	1.5	299	I-4	I-4	4.0
276	F-4	F-8	1.5	300	I-5	I-5	4.0
277	F-5	G-1	2.0	301	I-6	I-6	4.0
278	F-6	G-2	2.0	302	I-7	I-7	4.0
279	F-8	G-3	2.0	303	I-8	I-7	4.5
280	G-1	G-4	2.0	304	J-1	I-8	4.5
281	G-2	G-5	2.0	305	J-1	I-8	4.5
282	G-3	G-6	2.0	306	J-2	J-1	4.5
283	G-4	G-7	2.5	307	J-3	J-2	4.5
284	G-5	G-8	2.5	308	J-4	J-3	4.5
285	G-8	G-8	2.5	309	J-4	J-3	4.5
286	G-7	H-1	2.5	310	J-5	J-4	4.5
287	H-1	H-2	2.5	311	J-6	J-5	5.0
288	H-2	H-3	3.0	312	J-7	J-5	5.0
289	H-3	H-4	3.0	313	J-8	J-6	5.0
290	H-4	H-5	3.0	314	J-8	J-7	5.0
291	H-5	H-6	3.0	315	K-1	J-7	5.0
292	H-6	H-7	3.0	316	K-2	J-8	5.0
293	H-7	H-7	3.5	317	K-3	K-1	5.0

103. PRESETTING CHART FOR TUNED RECEIVER AND TRANSMITTER CIRCUITS (Cont.).

Channel frequency	SETTING NO.			Channel frequency	SETTING NO.		
	1, 2, 5	3, 4, 6	7		1, 2, 5	3, 4, 6	7
318	K-3	K-2	5.5	342	M-5	M-1	6.5
319	K-4	K-2	5.5	343	M-6	M-1	6.5
320	K-5	K-3	5.5	344	M-6	M-2	6.5
321	K-5	K-3	5.5	345	M-7	M-2	7.0
322	K-6	K-4	5.5	346	M-7	M-3	7.0
323	K-7	K-5	5.5	347	M-8	M-3	7.0
324	K-8	K-5	5.5	348	N-1	M-4	7.0
325	K-8	K-6	5.5	349	N-1	M-4	7.0
326	L-1	K-7	5.5	350	N-2	M-5	7.0
327	L-2	K-7	6.0	351	N-3	M-6	7.0
328	L-2	K-8	6.0	352	N-4	M-6	7.0
329	L-3	K-8	6.0	353	N-5	M-7	7.0
330	L-4	L-1	6.0	354	N-5	M-7	7.0
331	L-4	L-1	6.0	355	N-6	M-8	7.5
332	L-5	L-2	6.0	356	N-7	M-8	7.5
333	L-6	L-3	6.0	357	N-8	N-1	7.5
334	L-7	L-4	6.0	358	N-8	N-1	7.5
335	L-8	L-4	6.0	359	O-1	N-2	7.5
336	L-8	L-5	6.0	360	O-2	N-3	7.5
337	M-1	L-6	6.0	361	O-2	N-3	7.5
338	M-2	L-6	6.0	362	O-3	N-4	7.5
339	M-3	L-7	6.0	363	O-4	N-5	7.5
340	M-3	L-7	6.5	364	O-4	N-5	7.5
341	M-4	L-8	6.5	365	O-5	N-6	8.0

103. PRESETTING CHART FOR TUNED RECEIVER AND TRANSMITTER CIRCUITS (Cont.).

Channel frequency	SETTING NO.			Channel frequency	SETTING NO.		
	1, 2, 5	3, 4, 6	7		1, 2, 5	3, 4, 6	7
366	O-6	N-7	8.0	378	P-7	O-6	8.5
367	O-7	N-7	8.0	379	P-8	O-6	8.5
368	O-8	N-8	8.0	380	R-1	O-7	8.5
369	O-8	N-8	8.0	381	R-2	O-8	8.5
370	P-1	O-1	8.0	382	R-3	P-1	8.5
371	P-2	O-2	8.0	383	R-4	P-2	8.5
372	P-2	O-2	8.0	384	R-5	P-2	8.5
373	P-3	P-3	8.0	385	R-6	P-3	9.0
374	P-4	O-3	8.0	386	R-7	P-4	9.0
375	P-5	O-4	8.5	387	R-8	P-5	9.0
376	P-6	O-5	8.5	388	S-2	P-6	9.0
377	P-6	O-5	8.5	389	S-3	P-7	9.0

104. STEP-BY-STEP INSTRUCTIONS.

a. Turn on the set by turning VOLUME control to the right. Be sure the transmitter switch is on ALIGN OTHERS. Set ALIGN-OPERATE switch to ALIGN. Turn CHANNEL switch on the operating panel to channel A. Remove test prod from its holder and plug it into pin No. 1 on metering strip. Adjust A on SETTING NO. 1 for maximum closure on eye tube (eye tube sensitivity is controlled by the VOLUME control). Turn CHANNEL switch to channel B and adjust B on SETTING NO. 1 for maximum eye closure.

b. Plug test prod into pin No. 2 on metering strip and with the CHANNEL switch still on channel B adjust B on SETTING NO. 2 for maximum eye closure. Turn CHANNEL switch to channel A and adjust A on SETTING NO. 2 for maximum eye closure.

c. Replace test prod in its holder, throw ALIGN-OPERATE switch to OPERATE and adjust A and B on SETTING NO. 3, NO. 4, and NO. 7 for maximum noise in headphones with the CHANNEL switch in proper position at each adjustment. (Adjust both A and B on each setting before going on to the next setting.)

d. Throw the ALIGN-OPERATE switch to ALIGN. Wait approximately 30 seconds for eye tube to warm up. Plug test prod into pin No. 5-A on metering strip. Throw transmitter switch to ALIGN 5 AND 6. Depress microphone press-to-talk switch. (If channels A and B have been tuned alternately the CHANNEL switch will now be on channel B.) Proceed to adjust B on SETTING NO. 5 for maximum eye closure nearest calibration point (several closures will be noticed at this adjustment). Be sure to get the greatest eye closure nearest the original setting. Select the desired eye closure by adjusting the VOLUME control to required sensitivity. Turn CHANNEL switch to channel A, depress press-to-talk switch and adjust A on SETTING NO. 5 for maximum eye closure nearest calibration point.

e. Remove test prod from 5-A and plug into pin No. 5-B on metering strip, depress press-to-talk switch, and adjust VOLUME control for hairline closure on eye tube.

f. Remove test prod from pin No. 5-B on metering strip and plug into pin No. 5-C, depress press-to-talk switch and adjust A on SETTING NO. 5 until the eye just closes. Turn CHANNEL switch to channel B and adjust B on SETTING NO. 5 until the eye just closes.

NOTE: This is the most critical adjustment on the set. Exercise care to get the settings as exact a possible.

g. Plug test prod into pin No. 6 on metering strip, depress press-to-talk switch, and adjust B on SETTING No. 6 for maximum eye closure. To secure greatest accuracy of setting, adjust the eye sensitivity with the VOLUME control. Throw CHANNEL switch to A and adjust A on SETTING NO. 6 for maximum eye closure. Turn transmitter switch to ALIGN OTHERS. Adjust SETTING NO. 7A to minimum lamp brilliance. Throw CHANNEL switch to B and adjust 7B to minimum lamp brilliance. Plug test prod into pin No. 5-B on metering strip and adjust the VOLUME control to a hairline on the eye tube. Remove test prod from pin No. 5-B and plug into pin No. 5-C. Depress press-to-talk switch. Readjust B on SETTING NO. 5 for hairline opening on eye tube. Throw CHANNEL switch to A and repeat for SETTING NO. 5A. Replace test prod in holder. Throw ALIGN-OPERATE switch to OPERATE. Replace set cover. Channels A and B are now tuned to the frequencies established by the crystals. Connect antenna. The set is now ready to operate on the assigned channels.

NOTE: If the equipment is installed in a vehicle other than Truck ¼-ton, 4 x 4, readjust A and B on SETTING No. 7 for minimum lamp brilliance after the antenna has been connected.

SECTION XVI. REFERENCES

105. ARMY REGULATIONS.

AR 380-5.....Safeguarding Military Information.

106. SUPPLY PUBLICATIONS.

SIG 1.....Introduction to ASF Signal Supply Catalog.
SIG 2.....Complete Index to ASF Signal Supply Catalog.
SIG 3.....List of Items for Troop Issue.
SIG 4-1.....Allowances of Expendable Supplies.
SIG 4-2.....Allowances of Expendable Supplies for Schools, Training Centers, and Boards.
SIG 5.....Stock List of All Items.
SIG 6.....Sets (when published).
SB 11-6.....Dry Battery Supply Data.
SB 11-8.....Chests for Running Spares.
SB 11-10.....Signal Corps Kit and Materials for Moisture and Fungi-Resistant Treatment.
SB 11-17.....Electron Tube Supply Data.

107. TECHNICAL MANUALS ON AUXILIARY EQUIPMENT AND TEST EQUIPMENT.

TM 11-306.....Maintenance Equipment ME-13-( ).
TM 11-2632.....Remote Control Equipment RC-261.

108. PAINTING, PRESERVING, AND LUBRICATION.

TB SIG 6.....A Method of Prolonging the Life of Dry Batteries.
TB SIG 13.....Moistureproofing and Fungiproofing Signal Corps Equipment.
TB SIG 69.....Lubrication of Ground Signal Equipment.

109. CAMOUFLAGE.

FM 5-20.....Camouflage, Basic Principles.

110. SHIPPING INSTRUCTIONS.

U. S. Army Spec. No.
100-14A.....Army-Navy General Specification for Packaging and Packing for Overseas Shipment.

111. DECONTAMINATION.

TM 3-220.....Decontamination.

112. DEMOLITION.

FM 5-25.....Explosives and Demolitions.

113. OTHER PUBLICATIONS.

FM 21-6*.....List of Publications for Training.
W.D. Pamphlet 12-6†.List of Administrative and Supply Publications.
FM 24-18.....Radio Communication.
TB SIG 5.....Defense Against Radio Jamming.
TB SIG 25.....Preventive Maintenance of Power Cords.
TB SIG 66.....Winter Maintenance of Ground Signal Equipment.
TB SIG 72.....Tropical Maintenance of Ground Signal Equipment.
TB SIG 75.....Desert Maintenance of Ground Signal Equipment.
TB SIG 123.....Preventive Maintenance Practices for Ground Signal Equipment.
*Refer to for applicable technical bulletins.
†Refer to for applicable modification work orders.
TB SIG 143.....Installation Instructions for Vehicular Radio Sets.
TM 1-455.....Electrical Fundamentals.
TM 11-227.....Signal Communication Equipment Directory. Radio Communication Equipment.
TM 11-310.....Schematic Diagrams for Maintenance of Ground Radio Communication Sets.
TM 11-314.....Antennas and Antenna Systems.
TM 11-453.....Shop Work.
TM 11-455.....Radio Fundamentals.
TM 11-462.....Reference Data.
TM 11-483.....Suppression of Radio Noises.
TM 11-499.....Radio Propagation.
TM 11-619.....Radio Set SCR-619.
TM 11-982.....Battery Charger PE-219.
TM 11-2700 Series....Applicable Manuals.
TM 37-250.....Basic Maintenance Manual.

114. FORMS.

W. D., A.G.O. Form No. 468 (Unsatisfactory Equipment Report).
Army Air Forces Form No. 54 (unsatisfactory report).

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115. ABBREVIATIONS.

a-c	alternating-current
a-f	audio-frequency
a-f-c	automatic-frequency-control
a-m	amplitude-modulated
amp	ampere
d-c	direct-current
f-m	frequency-modulated
i-f	intermediate-frequency
kc	kilocycle
mc	megacycle
mf	microfarad
mmf	micromicrofarad
p-a	power-amplifier
r-f	radio-frequency
v	volts

116. GLOSSARY.

Refer to glossary in TM 11-455.

SECTION XVII. MAINTENANCE PARTS

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335.

The following information was compiled 4 April 1945. The appropriate section of the ASF Signal Supply Catalog for Receiver-Transmitter BC-1335 is:

Higher Echelon Spare Parts

SIG 8-BC-1335 ..... when published

For the latest index of available catalog sections, see ASF Signal Supply Catalog SIG 2.

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2C5395-1335	RECEIVER-TRANSMITTER BC-1335: FM; freq 27 to 38.9 mc; input 6 or 12v DC; Sig C Spec No. 271-3096.
	2Z307-51	ADAPTOR, antenna: connector; brass; black nickel pl; 2⅛" lg x 1⅜" diam overall; Delco part/dwg No. 7253908 (for assembly to antenna insulator).

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	3A9045	BATTERY, dry: 1¼v; cylindrical; ⅝" diam x 11/32" h over-all; Delco part/dwg No. 7253607 (Mallory bias cell).
	3C7270	CABLE ASSEMBLY: 6⅞" lg cable; six #18 stranded cond; cloth covered; rubber boot, 3⅛" lg x 1¼" wd x 1⅜" h; boot cemented to cable; Delco No. 7254292.
	2Z3351-30	CAP, weather-seal: with 2¼" lg chain; ¾" diam x 9/16" h; Amphenol No. 9760-10.
	2Z1612.26	CAP, weather-seal: with 2¼" lg chain; 1" diam x 9/16" h; Amphenol No. 9760-14.
C50	3D9005-56	CAPACITOR, fixed: ceramic; 5 mmf ±10% ½ mmf; 500 vdcw; max dimen 0.460" lg x 0.240" diam; CC30PH050D.
C26 C30	3D9008-22	CAPACITOR, fixed: ceramic; 8 mmf ±6⅔% ½ mmf; 500 vdcw; max dimen 0.460" lg x 0.240" diam; CC30PH080D.
C57 C63	3D9010-88	CAPACITOR, fixed: ceramic; 10 mmf ±5% ½ mmf; 500 vdcw; max dimen 0.460" lg x 0.240" diam; CC30PH100D.
C20 C64	3D9015-53	CAPACITOR, fixed; ceramic; 15 mmf ±7½% 1 mmf; 500 vdcw; max dimen 0.460" lg x 0.240" diam; CC30PH150F.
C16 C17	3D9024-11	CAPACITOR, fixed; ceramic; 24 mmf ±8⅓% 2 mmf; 500 vdcw; max dimen 0.460" lg x 0.240" diam; CC30PH240G.
C9	3D9027-12	CAPACITOR, fixed: ceramic; 27 mmf ±4% 1 mmf; 500 vdcw; max dimen 0.460" lg x 0.240" diam; CC30PH270F.
C14	3D9036-2	CAPACITOR, fixed: ceramic; 36 mmf ±3% 1 mmf; 500 vdcw; over-all dimen 0.460" lg x 0.240" diam; CC30PH360F; Delco part/dwg No. 7253883.
C19 C75	3D9051-16	CAPACITOR, fixed: ceramic; 51 mmf ±2%; 500 vdcw; max dimen 0.460" lg x 0.240" diam; CC30PG510G.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
C77, C78, C79, C80, C81, C82	3D9055-4.1	CAPACITOR, fixed: ceramic; feed-through type; 55 mmf ±10%; 0.520 mmf/mmf/°C temp coef; 1,000 vdcw; 1 5/32" lg x 11/32" diam; Globe-Union No. 817-001.
C3, C25, C29, C42, C56	3D9100-190	CAPACITOR, fixed: ceramic; 100 mmf ±5%; 500 vdcw; max dimen 0.460" lg x 0.240" diam; CC30SL101J.
C2, C10, C11, C13, C18, C49, C52, C54, C66	3D9240-15	CAPACITOR, fixed: ceramic; 240 mmf ±2%; 500 vdcw; max dimen 0.860" lg x 0.225 "diam; CC35TH241G.
C84A C84B	3DB20-80	CAPACITOR, fixed: electrolytic; 2-sect; 20-20 mf; 400 vdcw; metal can 3 1/32" lg x 1 15/32" diam; Aerovox No. CA-403-A (term located in plug in base which fits std octal socket).
C24	3DB40-54	CAPACITOR, fixed: electrolytic; 40 mf; 25 vdcw; 1 13/16" lg x 1" wd x 13/16" max h; Dubilier type No. AVL-10071 (metal case; hermetically sealed).
C73	3DB2000-4.1	CAPACITOR, fixed: electrolytic; 2,000 mf; 15 vdcw; with metal plate; 3 1/2" lg x 1 15/32" diam; Mallory type FP.
C21 C85	3K2051122	CAPACITOR, fixed: mica; 510 mmf ±5%; 500 vdcw; max dimen 51/64" lg x 15/32" wd x 7/32" thk; CM20B511J.
C22, C27, C28, C31, C32, C35, C39, C43, C44, C45, C51, C53, C55, C59, C60, C62, C65, C67, C68, C69, C70, C71, C72, C86, C87, C92	3DA10-228.1	CAPACITOR, fixed: paper, oil-filled; 10,000 mmf +20% −10%; 120 vdcw; 53/64" lg x 53/64" wd x 9/32" thk; CN36A103.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
C75	3DA20-146	CAPACITOR, fixed: paper, oil-filled; 20,000 mmf ±10%; 1,500 vdcw; 1 13/16" lg x 1" wd x 3/4" h; Delco part/dwg No. 7253765 (hermetically sealed).
C83A C83B C83C	3DA100-29	CAPACITOR, fixed: paper, oil-filled; 3 sect; 0.1-0.1-0.1 mf ±10%; 400 vdcw; 1 13/16" lg x 1" wd x 3/4" thk; CP50B5EF-104KK (hermetically sealed).
C23, C38, C88, C89 C90, C91, C93	3DA130-9	CAPACITOR, fixed: paper, oil-filled; 0.13 mf +30% −10%; 100 vdcw; 1 15/16" lg. x 5/8" diam; Fast No. A7854 (hermetically sealed).
C76	3DA500-202	CAPACITOR, fixed: paper, oil-filled; 0.5 mf ±10%; 400 vdcw; 1 13/16" lg x 1" wd x 3/4" h; Delco part/dwg No. 7253766 (hermetically sealed).
C4	3D9035VE2-1	CAPACITOR, variable: air; 3.7 mmf to 35.2 mmf; 0.016" air gap; body 1 3/4" lg x 15/16" wd x 1 7/32" h, shaft 3/4" lg x 1/4" diam; American Steel Package Co. No. 35-G, type H (stator lug located on right side).
C5	3D9035VE2-2	CAPACITOR, variable: air; 3.7 mmf to 35.2 mmf; 0.016" air gap; body 1 3/4" lg x 15/16" wd x 1 7/32" h, shaft 3/4" lg x 1/4" diam; American Steel Package Co. No 35-G, type H (stator lug on the left side).
C1, C58, C61	3D9013V-4	CAPACITOR, variable: ceramic; 2.5 to 13 mmf; zero temp coef; 500 vdcw; 1,300v RMS; 1 1/16" lg x 41/64" wd x 5/16" h; Centralab type No. 822BZ.
C12	3D9025V-59	CAPACITOR, variable: ceramic; 4.5 to 25 mmf ±15%; 0.0005 mmf/mmf/°C temp coef; 500 vdcw; 1,300v RMS test; 1 9/32" lg x 41/64" wd x 3/8" h; Centralab type No. 822 CN.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
C6, C7	3D9025V-52	CAPACITOR, variable: ceramic; 4.5 to 25 mmf; zero temp coef; 500 vdcw; 1,300 v RMS test; 27/32" lg x 41/64" wd x 17/32" h; Centralab type No. 822AZ.
L30	3C1084Z3-26	COIL, AF: filter; single winding, 0.008 hy min; 0.8 amp, 0.37 amp; 4 1/8" lg x 1 1/2" diam over-all; Jeffsonelec No. 466-001-205 (hermetically sealed).
L35	3C323-145C	COIL, AF: filter; single winding, 3.7 h min; 0.145 amp, 125 ohms; 2 3/32" max lg x 2 7/32" max wd x 3 21/32" h over-all; Jeffsonelec No. 466-001-206 (hermetically sealed).
L1	3C1084Z3-20	COIL, RF: antenna; one winding, single layer wound; unshielded; 9 turns of #20 AWG copper wire tinned; 1 11/16" lg x 1 3/8" diam over-all; Delco part/dwg No. 7254225.
L3, L32, L33, L34, L36, L37, L38, L39	3C1084Z3-21	COIL, RF; choke; single winding, single layer wound; unshielded; #28 E AWG wire; wound full length; 19/64" OD x 3/4" lg; Delco part/dwg No. 7253931 (dummy resistor form).
L14, L15	3C1084Z3-22	COIL, RF: choke; single winding, single layer wound; unshielded; #38 E AWG wire; wound full length, distributed capacity 0.7 mmf; 19/64" OD x 3/4" lg; Delco part/dwg No. 7253932 (dummy resistor form).
L5, L8, L16, L19, L24, L27, L29	3C1084Z3-15	COIL, RF: choke; single winding, 2 pie universal wound; unshielded; 70 turns per pie #38 SSE AWG wire, distributed cap 1.2 mmf; 7/16" diam x 3/4" lg; Delco part/dwg No. 7253929 (dummy resistor form).
L2, L4	3C1084Z3-29	COIL, RF: 2 windings, single layer wound; unshielded; 5 turns of #20 AWG copper wire tinned, tapped at 7/8 turn and at 2 1/2 turns; 1/2 turn of #22 AWG ins wire; 1 3/8" lg x 1 1/4" diam over-all; Delco part/dwg No. 7254224.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
L9, L10, L13	3C1084Z3-28	COIL, RF: choke; single winding, 2 pie universal wound; unshielded; 140 turns per pie #38 SSE AWG wire, distributed cap 0.7 mmf; 5/8" diam x 3/4" lg; Delco part/dwg No. 7253930 (dummy resistor form).
L28	3C1084Z3-27	COIL ASSEMBLY, RF: bias oscillator; single winding, 1 pie universal wound; shielded; rectangular; steel can, cadmium pl; 1 49/64" lg x 7/8" wd x 1 15/64" h; Delco part/dwg No. 7254438.
L6, L7	3C1084Z3-25	COIL ASSEMBLY, RF: doubler; single winding single layer wound; shielded; rectangular, aluminum can; 1 1/2" wd x 3/4" thk x 3 9/16" h; Delco part/dwg No. 7254079 (adjustable iron cores; 2 knob adjustments on top).
L22, L23	3C1084Z3-24	COIL ASSEMBLY, RF: mixer; single winding, single layer wound; shielded; rectangular; aluminum can 1 1/2" wd x 3/4" thk x 3 9/16" h; Delco part/dwg No. 7254077 (adjustable iron cores; 2 knob adjustments on top).
L17, L18	3C1084Z3-24	COIL ASSEMBLY, RF: 1st RF; single winding, single layer wound; shielded; rectangular; aluminum can 1 1/2" wd x 3/4" thk x 3 9/16" h; Delco part/dwg No. 7254075 (adjustable iron cores; 2 knob adjustments on top).
L20, L21	3C1084Z3-24	COIL ASSEMBLY, RF: 2d RF; single winding, single layer wound; shielded; rectangular; aluminum can 1 1/2" wd x 3/4" thk x 3 9/16" h; Delco part/dwg No. 7254076 (adjustable iron cores; 2 knob adjustments on top).
L25, L26	3C1084Z3-23	COIL ASSEMBLY, RF: crystal oscillator; single winding, single layer wound; shielded; rectangular; aluminum can 1 1/2" wd x 3/4" thk x 3 9/16" h; Delco part/dwg No. 7254078 (adjustable iron cores; 2 knob adjustments on top).

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
L11, L12	3C1084Z3-30	COIL ASSEMBLY, RF: transmitter oscillator; single winding, single layer wound; shielded, rectangular; aluminum can 1½" wd x ¾" thk x 3⁹⁄₁₆" h; Delco part/dwg No. 7254080 (adjustable iron cores 2 knob adjustments on top).
J2	2Z8799-239	CONNECTOR, female contact; single round female cont; straight; 1¹⁄₁₆" lg x 1" wd x 1" h over-all; Amphenol No. SO-239-83-IR.
P1	2Z3023-5	CONNECTOR, male contact: 3 round male cont; straight; 1³⁄₁₆" wd x 1³⁄₁₆" h x ²⁵⁄₃₂" lg including cont extension; Amphenol AN-3102-14S-7P-181.
	2Z3351-58	COVER, case: bottom; aluminum, olive drab finish; consists of case, plate, four washers and feet, gasket, and four washers; 11⁷⁄₆₄" lg x 10⁷⁄₆₄" wd x ¹⁹⁄₃₂" thk over-all; Delco part/dwg No. 7254166.
	2Z3351-59	COVER, case: top; aluminum, olive drab finish; consists of case, plate, gasket, 2 brackets, 8 hooks; 11⁴⁹⁄₆₄" lg x 10⁴⁹⁄₆₄" wd x 1¹⁄₆₄" thk over-all; Delco part/dwg No. 7253406.
		CRYSTAL UNITS FT-243: ea consisting of small plug-in type phenolic xtal holder w/xtal over-all dimen 1¹⁹⁄₃₂" h x ¹³⁄₃₂" wd x 7⁄₁₆" thk.
	2X179-5675	CRYSTAL UNIT FT-243: 5,675 kc; channel 27.0 mc.
	2X179-5700	CRYSTAL UNIT FT-243: 5,700 kc; channel 27.1 mc.
	2X179-5725	CRYSTAL UNIT FT-243: 5,725 kc; channel 27.2 mc.
	2X179-5750	CRYSTAL UNIT FT-243: 5,750 kc; channel 27.3 mc.
	2X179-5775	CRYSTAL UNIT FT-243: 5,775 kc; channel 27.4 mc.
	2X179-5800	CRYSTAL UNIT FT-243: 5,800 kc; channel 27.5 mc.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2X179-5825	CRYSTAL UNIT FT-243: 5,825 kc; channel 27.6 mc.
	2X179-5850	CRYSTAL UNIT FT-243: 5,850 kc; channel 27.7 mc.
	2X179-5875	CRYSTAL UNIT FT-243: 5,875 kc; channel 27.8 mc.
	2X179-5900	CRYSTAL UNIT FT-243: 5,900 kc; channel 27.9 mc.
	2X170-5925	CRYSTAL UNIT FT-243: 5,925 kc; channel 28.0 mc.
	2X179-5950	CRYSTAL UNIT FT-243: 5,950 kc; channel 28.1 mc.
	2X179-5975	CRYSTAL UNIT FT-243: 5,975 kc; channel 28.2 mc.
	2X179-6000	CRYSTAL UNIT FT-243: 6,000 kc; channel 28.3 mc.
	2X179-6025	CRYSTAL UNIT FT-243: 6,025 kc; channel 28.4 mc.
	2X179-6050	CRYSTAL UNIT FT-243: 6,050 kc; channel 28.5 mc.
	2X179-6075	CRYSTAL UNIT FT-243: 6,075 kc; channel 28.6 mc.
	2X179-6100	CRYSTAL UNIT FT-243: 6,100 kc; channel 28.7 mc.
	2X179-6125	CRYSTAL UNIT FT-243: 6,125 kc; channel 28.8 mc.
	2X179-6150	CRYSTAL UNIT FT-243; 6,150 kc; channel 28.9 mc.
	2X179-6175	CRYSTAL UNIT FT-243: 6,175 kc; channel 29.0 mc.
	2X179-6200	CRYSTAL UNIT FT-243: 6,200 kc; channel 29.1 mc.
	2X179-6225	CRYSTAL UNIT FT-243; 6,225 kc; channel 29.2 mc.
	2X179-6250	CRYSTAL UNIT FT-243: 6,250 kc; channel 29.3 mc.
	2X179-6275	CRYSTAL UNIT FT-243: 6,275 kc; channel 29.4 mc.
	2X179-6300	CRYSTAL UNIT FT-243: 6,300 kc; channel 29.5 mc.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2X179-6325	CRYSTAL UNIT FT-243: 6,325 kc; channel 29.6 mc.
	2X179-6350	CRYSTAL UNIT FT-243: 6,350 kc; channel 29.7 mc.
	2X179-6375	CRYSTAL UNIT FT-243: 6,375 kc; channel 29.8 mc.
	2X179-6400	CRYSTAL UNIT FT-243: 6,400 kc; channel 29.9 mc.
	2X179-6425	CRYSTAL UNIT FT-243: 6,425 kc; channel 30.0 mc.
	2X179-6450	CRYSTAL UNIT FT-243: 6,450 kc; channel 30.1 mc.
	2X179-6475	CRYSTAL UNIT FT-243: 6,475 kc; channel 30.2 mc.
	2X179-6500	CRYSTAL UNIT FT-243: 6,500 kc; channel 30.3 mc.
	2X179-6525	CRYSTAL UNIT FT-243: 6,525 kc; channel 30.4 mc.
	2X179-6550	CRYSTAL UNIT FT-243: 6,550 kc; channel 30.5 mc.
	2X179-6575	CRYSTAL UNIT FT-243: 6,575 kc; channel 30.6 mc.
	2X179-6600	CRYSTAL UNIT FT-243: 6,600 kc; channel 30.7 mc.
	2X179-6625	CRYSTAL UNIT FT-243: 6,625 kc; channel 30.8 mc.
	2X179-6650	CRYSTAL UNIT FT-243: 6,650 kc; channel 30.9 mc.
	2X179-6675	CRYSTAL UNIT FT-243: 6,675 kc; channel 31.0 mc.
	2X179-6700	CRYSTAL UNIT FT-243: 6,700 kc; channel 31.1 mc.
	2X179-6725	CRYSTAL UNIT FT-243: 6,725 kc; channel 31.2 mc.
	2X179-6750	CRYSTAL UNIT FT-243: 6,750 kc; channel 31.3 mc.
	2X179-6775	CRYSTAL UNIT FT-243: 6,775 kc; channel 31.4 mc.
	2X179-6800	CRYSTAL UNIT FT-243: 6,800 kc; channel 31.5 mc.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2X179-6825	CRYSTAL UNIT FT-243: 6,825 kc; channel 31.6 mc.
	2X179-6850	CRYSTAL UNIT FT-243: 6,850 kc; channel 31.7 mc.
	2X179-6875	CRYSTAL UNIT FT-243: 6,875 kc; channel 31.8 mc.
	2X179-6900	CRYSTAL UNIT FT-243: 6,900 kc; channel 31.9 mc.
	2X179-6925	CRYSTAL UNIT FT-243; 6,925 kc; channel 32.0 mc.
	2X179-6950	CRYSTAL UNIT FT-243: 6,950 kc; channel 32.1 mc.
	2X179-6975	CRYSTAL UNIT FT-243: 6,975 kc; channel 32.2 mc.
	2X179-7000	CRYSTAL UNIT FT-243: 7,000 kc; channel 32.3 mc.
	2X179-7025	CRYSTAL UNIT FT-243: 7,025 kc; channel 32.4 mc.
	2X179-7050	CRYSTAL UNIT FT-243: 7,050 kc; channel 32.5 mc.
	2X179-7075	CRYSTAL UNIT FT-243: 7,075 kc; channel 32.6 mc.
	2X179-7100	CRYSTAL UNIT FT-243: 7,100 kc; channel 32.7 mc.
	2X179-7125	CRYSTAL UNIT FT-243: 7,125 kc; channel 32.8 mc.
	2X179-7150	CRYSTAL UNIT FT-243: 7,150 kc; channel 32.9 mc.
	2X179-7175	CRYSTAL UNIT FT-243: 7,175 kc; channel 33.0 mc.
	2X179-7200	CRYSTAL UNIT FT-243: 7,200 kc; channel 33.1 mc.
	2X179-7225	CRYSTAL UNIT FT-243: 7,225 kc; channel 33.2 mc.
	2X179-7250	CRYSTAL UNIT FT-243: 7,250 kc; channel 33.3 mc.
	2X179-7275	CRYSTAL UNIT FT-243: 7,275 kc; channel 33.4 mc.
	2X179-7300	CRYSTAL UNIT FT-243: 7,300 kc; channel 33.5 mc.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2X179-7325	CRYSTAL UNIT FT-243: 7,325 kc; channel 33.6 mc.
	2X179-7350	CRYSTAL UNIT FT-243: 7,350 kc; channel 33.7 mc.
	2X179-7375	CRYSTAL UNIT FT-243: 7,375 kc; channel 33.8 mc.
	2X179-7400	CRYSTAL UNIT FT-243: 7,400 kc; channel 33.9 mc.
	2X179-7425	CRYSTAL UNIT FT-243: 7,425 kc; channel 34.0 mc.
	2X179-7450	CRYSTAL UNIT FT-243: 7,450 kc; channel 34.1 mc.
	2X179-7475	CRYSTAL UNIT FT-243: 7,475 kc; channel 34.2 mc.
	2X179-7500	CRYSTAL UNIT FT-243: 7,500 kc; channel 34.3 mc.
	2X179-7525	CRYSTAL UNIT FT-243: 7,525 kc; channel 34.4 mc.
	2X179-7550	CRYSTAL UNIT FT-243: 7,550 kc; channel 34.5 mc.
	2X179-7575	CRYSTAL UNIT FT-243: 7,575 kc; channel 34.5 mc.
	2X179-7600	CRYSTAL UNIT FT-243: 7,600 kc; channel 34.7 mc.
	2X179-7625	CRYSTAL UNIT FT-243: 7,625 kc; channel 34.8 mc.
	2X179-7650	CRYSTAL UNIT FT-243: 7,650 kc; channel 34.9 mc.
	2X179-7675	CRYSTAL UNIT FT-243: 7,675 kc; channel 35.0 mc.
	2X179-7700	CRYSTAL UNIT FT-243: 7,700 kc; channel 35.1 mc.
	2X179-7725	CRYSTAL UNIT FT-243: 7,725 kc; channel 35.2 mc.
	2X179-7750	CRYSTAL UNIT FT-243: 7,750 kc; channel 35.3 mc.
	2X179-7775	CRYSTAL UNIT FT-243: 7,775 kc; channel 35.4 mc.
	2X179-7800	CRYSTAL UNIT FT-243: 7,800 kc; channel 35.5 mc.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2X179-7825	CRYSTAL UNIT FT-243: 7,825 kc; channel 35.6 mc.
	2X179-7850	CRYSTAL UNIT FT-243: 7,850 kc; channel 35.7 mc.
	2X179-7875	CRYSTAL UNIT FT-243: 7,875 kc; channel 35.8 mc.
	2X179-7900	CRYSTAL UNIT FT-243: 7,900 kc; channel 35.9 mc.
	2X179-7925	CRYSTAL UNIT FT-243: 7,925 kc; channel 3 6.0 mc.
	2X179-7950	CRYSTAL UNIT FT-243: 7,950 kc; channel 36.1 mc.
	2X179-7975	CRYSTAL UNIT FT-243: 7,975 kc; channel 36.2 mc.
	2X179-8000	CRYSTAL UNIT FT-243: 8,000 kc; channel 36.3 mc.
	2X179-8025	CRYSTAL UNIT FT-243: 8,025 kc; channel 36.4 mc.
	2X179-8050	CRYSTAL UNIT FT-243: 8,050 kc; channel 36.5 mc.
	2X179-8075	CRYSTAL UNIT FT-243: 8,075 kc; channel 36.6 mc.
	2X179-8100	CRYSTAL UNIT FT-243: 8,100 kc; channel 36.7 mc.
	2X179-8125	CRYSTAL UNIT FT-243: 8,125 kc; channel 36.8 mc.
	2X179-8150	CRYSTAL UNIT FT-243: 8,150 kc; channel 36.9 mc.
	2X179-8175	CRYSTAL UNIT FT-243: 8,175 kc; channel 37.0 mc.
	2X179-8200	CRYSTAL UNIT FT-243: 8,200 kc; channel 37.1 mc.
	2X179-8225	CRYSTAL UNIT FT-243: 8,225 kc; channel 37.2 mc.
	2X179-8250	CRYSTAL UNIT FT-243: 8,250 kc; channel 37.3 mc.
	2X179-8275	CRYSTAL UNIT FT-243: 8,275 kc; channel 37.4 mc.
	2X179-8300	CRYSTAL UNIT FT-243: 8,300 kc; channel 37.5 mc.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2X179-8325	CRYSTAL UNIT FT-243: 8,325 kc; channel 37.6 mc.
	2X179-8350	CRYSTAL UNIT FT-243: 8,350 kc; channel 37.7 mc.
	2X179-8375	CRYSTAL UNIT FT-243: 8,375 kc; channel 37.8 mc.
	2X179-8400	CRYSTAL UNIT FT-243: 8,400 kc; channel 37.9 mc.
	2X179-8425	CRYSTAL UNIT FT-243: 8,425 kc; channel 38.0 mc.
	2X179-8450	CRYSTAL UNIT FT-243: 8,450 kc; channel 38.1 mc.
	2X179-8475	CRYSTAL UNIT FT-243: 8,475 kc; channel 38.2 mc.
	2X179-8500	CRYSTAL UNIT FT-243: 8,500 kc; channel 38.3 mc.
	2X179-8525	CRYSTAL UNIT FT-243: 8,525 kc; channel 38.4 mc.
	2X179-8550	CRYSTAL UNIT FT-243: 8,550 kc; channel 38.5 mc.
	2X179-8575	CRYSTAL UNIT FT-243: 8,575 kc; channel 38.6 mc.
	2X179-8600	CRYSTAL UNIT FT-243: 8,600 kc; channel 38.7 mc.
	2X179-8625	CRYSTAL UNIT FT-243: 8,625 kc; channel 38.8 mc.
	2X179-8650	CRYSTAL UNIT FT-243: 8,650 kc; channel 38.9 mc.
	6Z6918-6	FASTENER, latch: trunk; steel; olive drab; 2⅛″ lg x 1⅜″ wd x ½″ h over-all; Corbin #15840-1.
	6Z3810-52	FASTENER, latch: trunk; steel; olive drab; 2⅞″ lg x 1⅝″ wd x ½″ h over-all; Corbin #15795-G.
L31 C74A C74B	3Z1891-21.3	FILTER ASSEMBLY: "A" supply; consists of dual 250,000 mmf cap, and R-F choke coil on 0.050″ aluminum bracket; 3 15/32″ lg x 1 3/64″ wd x 1⅜″ h over-all; Delco part/dwg No. 7253767.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
F1	3Z1921	FUSE FU-21A: 10 amp, 25v; glass body; ferrule ends; 0.252″ diam x 1¼″ lg; Littelfuse No. 3AG.
	2Z4866.245	GASKET: synthetic rubber; 1″ sq x 1/16″ thk; Delco part/dwg No. 7253520 (antenna connector).
	2Z4866.246	GASKET: synthetic rubber; 1⅜″ OD x 5/16″ ID x 0.050″ thk; Delco part/dwg No. 7253527 (antenna connector).
	2Z4866.244	GASKET: synthetic rubber; antenna insulator; 3 27/32″ OD x 2 15/16″ ID x 1/16″ thk; Delco part/dwg No. 7253442.
	2Z4866.243	GASKET: synthetic rubber; 5/8″ OD x ½″ ID x 0.062″ sq; Delco part/dwg No. 7253517 (band switch).
	2Z4866.238	GASKET: synthetic rubber; 11″ lg x 10″ wd x 7/32″ thk; Delco part/dwg No. 7253639 (case cover).
	2Z4866.239	GASKET: synthetic rubber; 7/16″ OD x 0.160″ ID x 1/16″ thk; Delco part/dwg No. 7253516 (cover screw).
	2Z4866.240	GASKET: synthetic rubber; 21/32″ OD x 23/64″ ID x 1/32″ thk; Delco part/dwg No. 7253464 (jack water-seal).
	2Z4866.242	GASKET: synthetic rubber; 1 3/16″ sq x 1/16″ thk; Delco part/dwg No. 7253519 (power connector).
	2Z4866.241	GASKET: synthetic rubber; ½″ OD x 3/8″ ID x 0.062″ sq; Delco part/dwg No. 7253534 (volume control).
	2Z8276-22	HOLDER ASSEMBLY: test prod; bakelite; consists of holder, spring, lockwasher and hexagon nut; 2⅜″ lg x 7/16″ diam; Delco part/dwg No. 7254449.
	3Z3275-9	HOLDER, fuse: extractor post; bakelite body; 11/16″ diam x 2⅝″ lg; Littelfuse No. 1075-F.
	3G1838-64.8	INSULATOR, disk: flat; natural xx bakelite; 4″ diam x ½″ thk; Delco part/dwg No. 7253633.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	3G1836-14	INSULATOR, tube: cylindrical; natural x bakelite; 7/8" lg over-all, base diam 0.593", top diam 0.515", ID 0.437"; Delco part/dwg No. 7253444 (for current indicator lamp).
J3A J3B J3C	4C4312-20	JACK ASSEMBLY, telephone: 3 jacks on metal strip; 2 for 2-cond phone plug, 1 for 3-cond microphone plug; 2 57/64" lg x 3/4" wd x 1.240" d over-all, strip 3/64" thk, cadmium pl; Delco part/dwg No. 7254251.
J4	2Z3067-22	JACK ASSEMBLY, test prod: 6 pin jacks on bakelite strip; 2 9/16" lg x 1/2" wd x 19/32" h over-all; Delco part/dwg No. 7253616.
	2Z5822-131	KNOB, bar: black alumalite; die cast alloy; for double flat shaft 1/4" diam; 1/8" diam hole for mtg screw; 1" lg x 3/8" wd x 13/32" h over-all; Delco part/dwg No. 7253629.
	2Z5753.46	KNOB, round: black bakelite and black nickeled steel; for 1/4" diam shaft; two #4-40 setscrews; 5/8" diam x 1 1/2" lg over-all; Delco part/dwg No. 7253858.
	2Z5971.1	LAMP, incandescent: 2v, 0.060 amp; bulb T-3 1/4 clear; miniature bayonet base; Mazda No. 49.
J1	2Z5883-229	LAMPHOLDER: minature bayonet; steel shell 1 1/4" lg x 1 1/8" wd x 7/8" d over-all; Delco part/dwg No. 7253665 (antenna current indicator).
	3E7270-1	LEAD, test: w/tip, tube and pin 20" lg x 1/4" diam over-all; Delco part/dwg No. 7253918.
	2Z6740.7	MOUNTING, fuseholder: zinc die casting; dicromate dipped; 2 7/16" lg x 1 3/8" wd x 15/16" thk over-all; Delco part/dwg No. 7253754.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2Z6721-250	MOUNTING FT-250: steel; olive drab; mounting rack for rec/xmtr and battery box assemblies; 21⅛″ lg x 11″ wd x 4⅝″ h over-all.
	2Z6740.6	MOUNTING ASSEMBLY, battery: bias; to mount four 1¼ bias cells; consists of holders on bakelite strip; 3⅝″ lg x 13/16″ wd x 13/16″ h over-all; Delco part/dwg No. 7253506.
	3Z741-16	POST, binding: screw type; Ebanol "S" finish; 1 9/32″ lg x ½″ diam over-all; 11/32″ lg x 0.164″ diam mtg stem w/#8-32 thd; Delco part/dwg No. 7253873.
R59, R60	3RC21BF100J	RESISTOR, fixed: composition; 10 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF100J.
R61	3RC21BF180J	RESISTOR, fixed: composition; 18 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF180J.
R2	3RC20BF390J	RESISTOR, fixed: composition; 39 ohms ±5%; ½w; max dimen 0.468″ lg x 0.249″ diam; RC20BF390J.
R52, R53, R54	3RC21BF560J	RESISTOR, fixed: composition; 56 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF560J.
R1	3RC21BF820J	RESISTOR, fixed: composition; 82 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF820J.
R54	3RC31BF101K	RESISTOR, fixed: composition; 100 ohms ±10%; 1w; max dimen 0.750″ lg x 0.280″ diam; RC31BF101K.
R62	3RC30BF221J	RESISTOR, fixed: composition; 220 ohms ±5%; 1w; max dimen 0.750″ lg x 0.280″ diam; RC30FB221J.
R10	3RC21BF331K	RESISTOR, fixed: composition; 330 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF331K.
R15, R16, R18	3RC21BF152K	RESISTOR, fixed: composition; 1,500 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF152K.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
R39	3RC21BF222K	RESISTOR, fixed: composition; 2,200 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF222K.
R6, R41	3RC20BF332K	RESISTOR, fixed: composition; 3,300 ohms ±10%; ½w; max dimen 0.468″ lg x 0.249″ diam; RC20BF332K.
R3	3RC21BF472J	RESISTOR, fixed: composition; 4,700 ohms ±5%; ½w; max dimen 0.656 ″ lg x 0.249″ diam; RC21BF472J.
R8, R19, R20	3RC21BF472K	RESISTOR, fixed: composition: 4,700 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF472K.
R57, R58	3RC31BF562K	RESISTOR, fixed: composition; 5,600 ohms ±10%; 1w; max dimen 1.28″ lg x 0.310″ diam; RC31BF562K.
R7	3RC21BF682J	RESISTOR, fixed: composition; 6,800 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF682J.
R47	3RC21BF822J	RESISTOR, fixed: composition; 8,200 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF822J.
R5, R25, R38	3RC21BF103J	RESISTOR, fixed: composition; 10,000 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF103J.
R49	3RC21BF223J	RESISTOR, fixed: composition; 22,000 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF223J.
R17	3RC21BF223K	RESISTOR, fixed: composition; 22,000 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF223K.
R9, R13, R33	3RC21BF273K	RESISTOR, fixed: composition; 27,000 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF273K.
R30	3RC21BF333K	RESISTOR, fixed: composition; 33,000 ohms ±10%; max dimen ½w; 0.655″ lg x 0.249″ diam; RC21BF333K.
R4	3RC20BF393J	RESISTOR, fixed: composition; 39,000 ohms ±5%; ½w; max dimen 0.468″ lg x 0.249″ diam; RC20BF393J.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
R24	3RC20BF473K	RESISTOR, fixed: composition; 47,000 ohms ±10%; ½w; max dimen 0.468 lg x 0.249″ diam; RC20BF473K.
R32	3RC21BF563K	RESISTOR, fixed: composition; 56,000 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF563K.
R26, R27	3RC21BF104J	RESISTOR, fixed: composition; 100,000 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF104J.
R22, R36	3RC20BF104K	RESISTOR, fixed: composition; 100,000 ohms ±10%; ½w; max dimen 0.468″ lg x 0.249″ diam; RC20BF104K.
R45	3RC21BF124J	RESISTOR, fixed: composition; 120,000 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF124J.
R11	3RC31BF224J	RESISTOR, fixed: composition; 220,000 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF224J.
R42, R44	3RC21BF224K	RESISTOR, fixed: composition; 220,000 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF224K.
R37, R40	3RC21BF334K	RESISTOR, fixed: composition; 330,000 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF334K.
R21, R29, R35, R51	3RC21BF474K	RESISTOR, fixed: composition; 470,000 ohms ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF474K.
R12, R50, R23	3RC21BF474J	RESISTOR, fixed: composition; 470,000 ohms ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF474J.
R14, R28, R34	3RC21BF105K	RESISTOR, fixed: composition; 1 meg ±10%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF105K.
R43, R46	3RC21BF105J	RESISTOR, fixed: composition; 1 meg ±5%; ½w; max dimen 0.655″ lg x 0.249″ diam; RC21BF105J.
R66	3RW3304	RESISTOR, fixed: ww 0.31 ohms ±10%; 7w; over-all dimen 1″ lg x 19/32″ diam; RW30GR31; Delco part/dwg No. 7254452.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
R55, R56	3Z6004-44	RESISTOR, fixed: ww 40 ohms ±5%; 3w; 1 1/16" lg x 7/16" diam; Letrohm 1T.
R63	3Z6070-20	RESISTOR, fixed: ww 700 ohms ±10%; 10w; 1 3/4" lg x 5/16" diam; Hard-Hindle No. 13/4E.
R48	3Z7410-40	RESISTOR, variable: carbon; 10,000 ohms ±10%; inclosed body 1 1/2" diam x 15/32" d, shaft 1/4" diam x 15/32" lg; Stackpole type LM (screwdriver slot).
R31	3Z7499-1.15	RESISTOR, variable (potentiometer): carbon; 1 meg; 3 term; inclosed body 15/32" diam x 1 1/8" d, shaft 1/4" diam x 5/32" lg; CTS #45 series, type W-4142 (curve "B"; includes SW1, SPST switch).
	2Z7780-11	RETAINER ASSEMBLY, crystal unit: 1 3/16" lg x 1 3/16" wd x 2" h over-all; Delco part/dwg No. 7253678 (consists of bracket, spring, sleeve, 2 bushings, pin).
	6L6632-36.49S	SCREW, machine: RH; steel, cadmium pl; #6-32, NC; 2 1/4" lg over-all; 1 1/4" lg thd; head 1/4" diam, 3/32" thk; Delco part/dwg No. 192207.
	2Z8273-5	SEAL, water: steel; olive drab finish; 1 7/16" lg x 15/16" wd x 7/8" d, Delco part/dwg No. 7253660 (engraved "MIC").
	2Z8273-6	SEAL, water: steel; olive drab finish; 1 7/16" lg x 15/16" wd x 7/8" d; Delco part/dwg No. 7253664 (engraved "PH").
	2Z8308-28	SHIELD, tube: drawn aluminum; round, open top; slot mtd; 15/16" OD x 1 3/4" lg x 0.015" thk stock; Eby No. 7797.
X1	2Z8678	SOCKET, crystal: 4 prong; molded bakelite; 0.805" lg x 23/32" wd x 11/16" h over-all; Cinch No. 9804.
	2Z8659-7	SOCKET, tube: 6 prong std base; molded bakelite; 1 7/8" diam x 13/16" h over-all; Amphenol No. M1P6 (for vibrator).
	2Z8678.219	SOCKET, tube: 7 prong; miniature base; molded bakelite; 1 3/32" diam x 1 17/64" h over-all; Eby No. 7676.

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
	2Z8677.96	SOCKET, tube: 7 prong; miniature base; molded ceramic; 1 3/32" diam x 1 17/64" h over-all; Delco part/dwg No. 7253819.
	2Z8678.231	SOCKET, tube: std octal; molded bakelite; 1 5/8" diam x 13/16" h over-all; Cinch No. 6742.
	2Z8879.101	SPRING, contact: grounding, 0.011" thk spring brass, cadmium pl; 1 39/64" lg x 5/8" wd x 3/8" h over-all; Delco part/dwg No. 7253814.
	2Z8879-56	SPRING, retainer: chart; 0.016" thk phosphor bronze, nickel pl; 1 7/16" lg x 3/8" wd x 9/64" h over-all; Delco part/dwg No. 7253431.
	2Z8879-55	SPRING, retainer: vibrator; carbon steel, cadmium pl; 1 7/8" diam x 19/32" wd x 0.027" thk; Cinch No. 52092; Delco part/dwg No. 7253758.
S3A, S3B, S3C	3Z9580-2.2	SWITCH, lever: 2 position, nonlocking; cont arrangement position #1-1A2B, position No. 2-2B1A; bakelite insulation; 1 7/8" lg x 5/8" wd x 2 1/4" h over-all; Globe-Union No. N7806XT (align-operate switch).
S5A, S5B, S5C	3Z9825-55.77	SWITCH, rotary: 4 SPST, 5 pole, 2 position; 3 sect; nonlocking; cont arrangement position No. 1-2A2B-2A2B-2A and shorting, position No. 2-2B2A-2B1A; bakelite insulation; 4 3/32" lg x 1 15/16" wd x 1 3/4" h over-all; Mallory type No. RM (6v, 12v change-over).
S2A, S2B, S2C, S2D, S2E, S2F, S2G, S2H, S2J	3Z9835-4.4	SWITCH, slide: 2 position, nonlocking; cont arrangement position #19A9B, position No. 2-9B9A; bakelite insulation; 9 27/64" lg x 2 1/8" wd x 1 1/2" h over-all; Oak No. 8825 (frequency change switch).

117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
S1A, S1B	3Z9849.12	SWITCH, toggle: DPST; bakelite body; 1 5/32" lg x 1 1/16" wd x 1 1/2" h over-all; C-H No. 8370K1.
T1	2Z9631.269	TRANSFORMER, AF: microphone; pri 8.5 ohms; secd 1,300 ohms; hermetically sealed; upright shielded case; 1 3/4" lg x 1" diam; Jeffsonelec No. 467-001-218; Delco part/dwg No. 7253507 (turns ratio of pri to secd 1 to 20).
T6	2Z9632.381	TRANSFORMER, AF: output; pri 25,000 ohms; secd 4,000 ohms tapped at 250 ohms; hermetically sealed; 1 3/4" x 1" diam; Jeffsonelec No. 467-001-219; Delco part/dwg No. 7253508 (turns ratio of pri to secd 6 1/4 to 1).
T2	2Z9643.190	TRANSFORMER, IF: 4.3 mc; input; shielded; 3 3/8" lg x 1 5/16" wd x 3/4" d over-all Delco part/dwg No. 7254025 (adjustable iron cores).
T3	2Z9643.191	TRANSFORMER, IF: 4.3 mc; interstage; shielded; 3 3/8" lg x 1 5/16" wd x 3/4" d over-all; Delco part/dwg No. 7254026 (adjustable iron cores C-36, C-37 included) (2d IF).
T4	2Z9643.192	TRANSFORMER, IF: 4.3 mc; interstage; shielded; 3 3/8" lg x 1 5/16" wd x 3/4" d over-all; Delco part/dwg No. 7254027 (adjustable iron cores C-40, C-41 included) (limiter).
T5	2Z9643.189	TRANSFORMER, IF: 4.3 mc; shielded; hermetically sealed case; 5" lg x 1 5/8" diam over-all; Delco part/dwg No. 7254065 (adjustable iron cores C-45, C-47, C-48 included) (limiter).
T7	2Z9608-56	TRANSFORMER, power: plate and fil; pri 6 and 12v AC; secd 340v CT; fully inclosed steel case; 3 21/64" lg x 2 53/64" wd x 4 3/8" h over-all; Jeffsonelec No. 465-001-209.

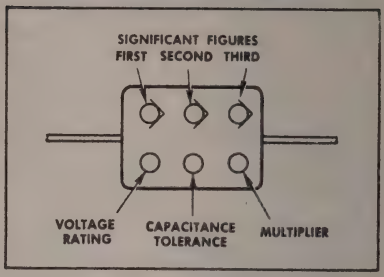
117. MAINTENANCE PARTS FOR RECEIVER-TRANSMITTER BC-1335 (Cont.).

Ref Symbol	Signal Corps Stock No.	Name of Part and Description
R64, R65	3Z6925-3.10	TUBE, ballast: glass; 4.2v, 0.32 amp; T-9 bulb, 3 5/16" lg over-all; Amperite No. 3H-1-7.
V12	2J1A3	TUBE, electron: JAN-1A3.
V6, V7, V9, V10, V11, V14, V17	2J1L4	TUBE, electron: JAN-1L4.
V8, V16	2J1R5	TUBE, electron: JAN-1R5.
V1, V2, V3, V4, V13	2J3A5	TUBE, electron: JAN-3A5.
V5, V15	2J3Q4	TUBE, electron: JAN-3Q4.
V18	2J6AF6G	TUBE, electron: JAN-6AF6G.
V19	2JOB3/VR90	TUBE, electron: JAN-OB3/VR90.
	3H6694.2-3	VIBRATOR UNIT: sync; vibrator rect; input 6v DC, 5 amp; 3 3/4" lg x 1 1/2" diam over-all; Mallory No. 5386.
	2ZA951-19	VISOR: bakelite; round; grade x black bakelite; 1 9/32" OD x 1 7/32" ID x 3 3/16" lg; Delco part/dwg No. 7253606.
	6L50244BN	WASHER, cup: brass, black nickel pl; cup ID 7/16" x 1/4" hole diam x 5/64" h; Delco part/dwg No. 7253421.
	6RK55232	WRENCH: setscrew; 1 5/8" lg x 7/16" wd x 0.060" diam over-all; L shape, fluted; Bristolco No. 4.

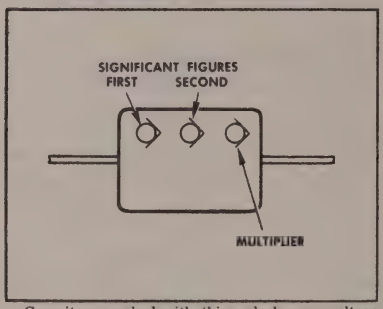
Order No. 10376-Phila-45-01; 49,300 copies; July 1945.

CAPACITOR COLOR CODES

RMA 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS

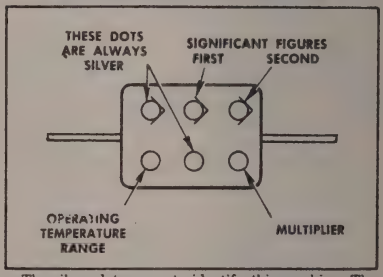


RMA 3-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



Capacitors marked with this code have a voltage rating of 500 volts.

AWS 6-DOT COLOR CODE FOR PAPER-DIELECTRIC CAPACITORS

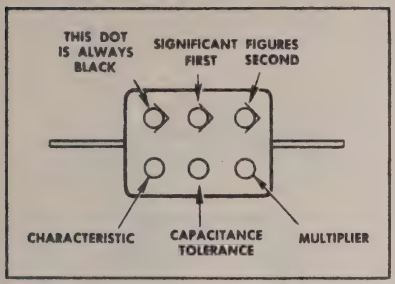


The silver dots serve to identify this marking. The sixth dot shows whether the capacitor has a maximum operating temperature of 167°F (black) or 185°F (brown).

COLOR	SIGNIFICANT FIGURE	MULTIPLIER		VOLTAGE RATING (VOLTS)	CHARACTERISTIC (AWS MICA-DIELECTRIC)
		RMA MICA- AND CERAMIC-DIELECTRIC AWS MICA- AND PAPER-DIELECTRIC	AWS CERAMIC-DIELECTRIC		
BLACK	0	1	1		A
BROWN	1	10	10	100	B
RED	2	100	100	200	C
ORANGE	3	1000	1000	300	D
YELLOW	4	10,000		400	E
GREEN	5	100,000		500	F
BLUE	6	1,000,000		600	G
VIOLET	7	10,000,000		700	
GRAY	8	100,000,000	0.01	800	
WHITE	9	1,000,000,000	0.1	900	
GOLD		0.1		1000	
SILVER		0.01		2000	
NO COLOR				500	

Figure 59. Capacitor color codes.

AWS 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



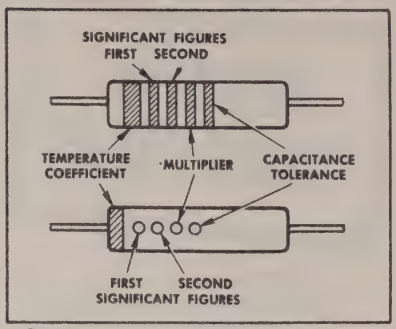
The black dot serves to identify the AWS marking. Capacitors marked with this code are rated at 500 volts, except the following. AWS type CM35 capacitors with capacitances of 6,800, 7,500, and 8,200 micromicrofarads, and AWS type CM40 capacitors with capacitances of 9,100 and 10,000 micromicrofarads are rated at 300 volts.

RMA: *Radio Manufacturers Association*

AWS: *American War Standard (American Standards Association)*

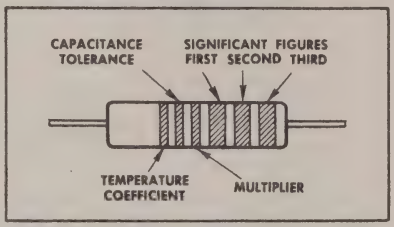
NOTE: These color codes give all capacitances in *micromicrofarads*.

AWS COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS



Capacitors marked with this code have a voltage rating of 500 volts.

RMA COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS

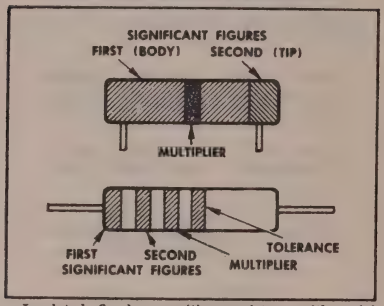


Capacitors marked with this code have a voltage rating of 500 volts.

CAPACITANCE TOLERANCE				*TEMPERATURE COEFFICIENT OF CAPACITANCE x10⁻⁶ MMF/MMF/°C
RMA & AWS MICA- AND PAPER-DIELECTRIC (PERCENT)	RMA CERAMIC-DIELECTRIC (PERCENT)	AWS CERAMIC-DIELECTRIC GREATER THAN 10 MMF (PERCENT)	AWS CERAMIC-DIELECTRIC LESS THAN 10 MMF (MMF)	
20	20	20	2.0	0
1	1	1		− 30
2	2	2		− 80
3	3	2.5	0.25	−150
4	4			−220
5	5	5	0.5	−330
6	6			−470
7	7			−750
8	2.5			+ 30
9	10	10	1.0	Not specified
5				
10				
20				TL 13417

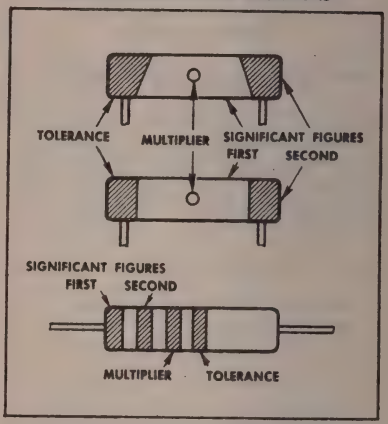
RESISTOR COLOR CODES

RMA COLOR CODE FOR FIXED COMPOSITION RESISTORS



• Insulated fixed composition resistors with axial leads are designated by a natural tan background color. Non-insulated fixed composition resistors with axial leads are designated by a black background color.

AWS COLOR CODE FOR FIXED COMPOSITION RESISTORS



The exterior body color of insulated resistors may be any color except black. The usual color is natural tan. The exterior body color of uninsulated resistors with axial leads may be either black or white. The exterior body color of uninsulated resistors with radial leads may be black or it may be the color of the first significant figure of the resistance value.

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	
RED	2	100	
ORANGE	3	1000	
YELLOW	4	10,000	
GREEN	5	100,000	
BLUE	6	1,000,000	
VIOLET	7	10,000,000	
GRAY	8	100,000,000	
WHITE	9	1,000,000,000	
GOLD		0.1	5
SILVER		0.01	10
NO COLOR			20

RMA: *Radio Manufacturers Association*
AWS: *American War Standard (American Standards Association)*

TL 13418

Figure 60. Resistor color codes.

☆ U. S. GOVERNMENT PRINTING OFFICE : 0—1950

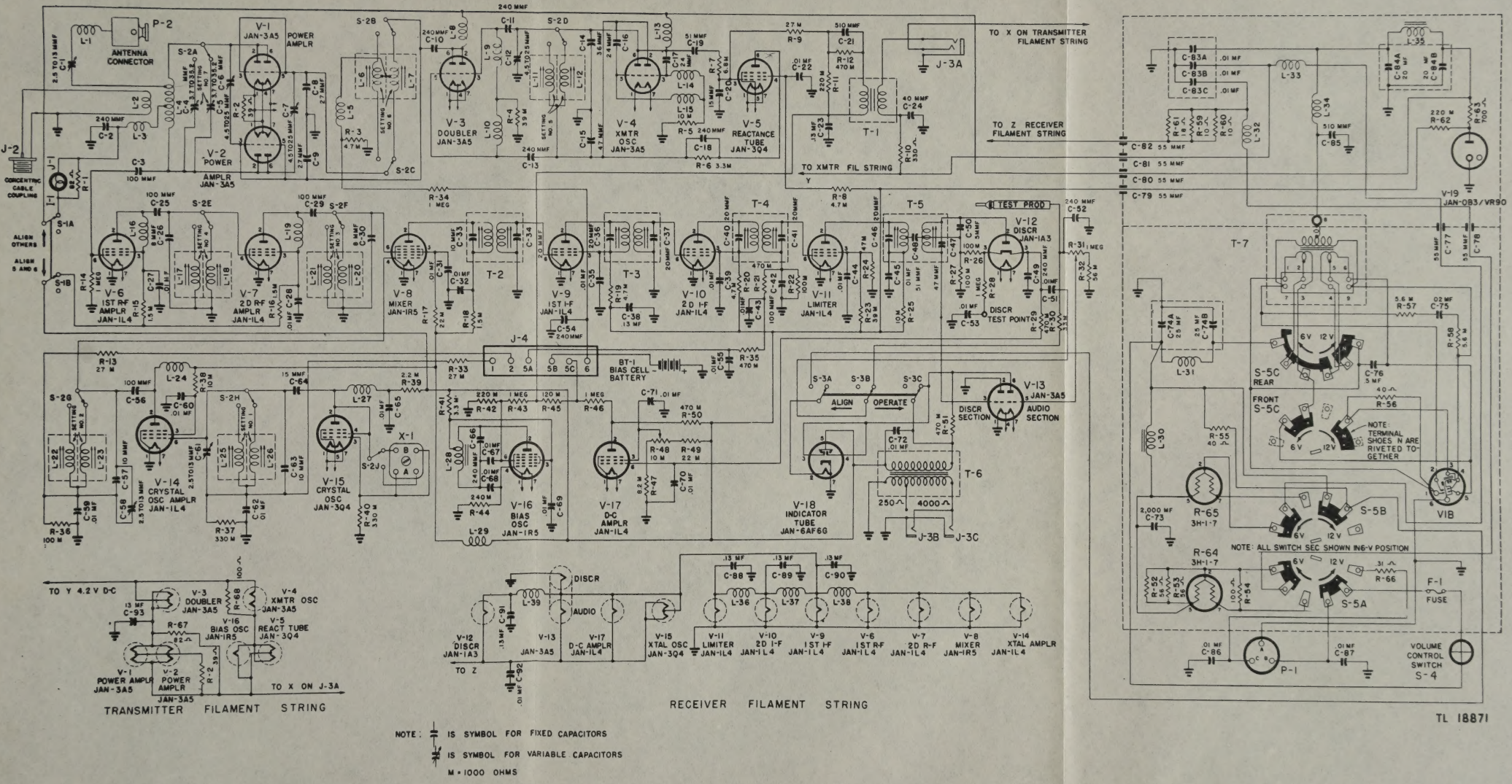


Figure 61. Receiver-Transmitter BC-1335, complete schematic diagram.

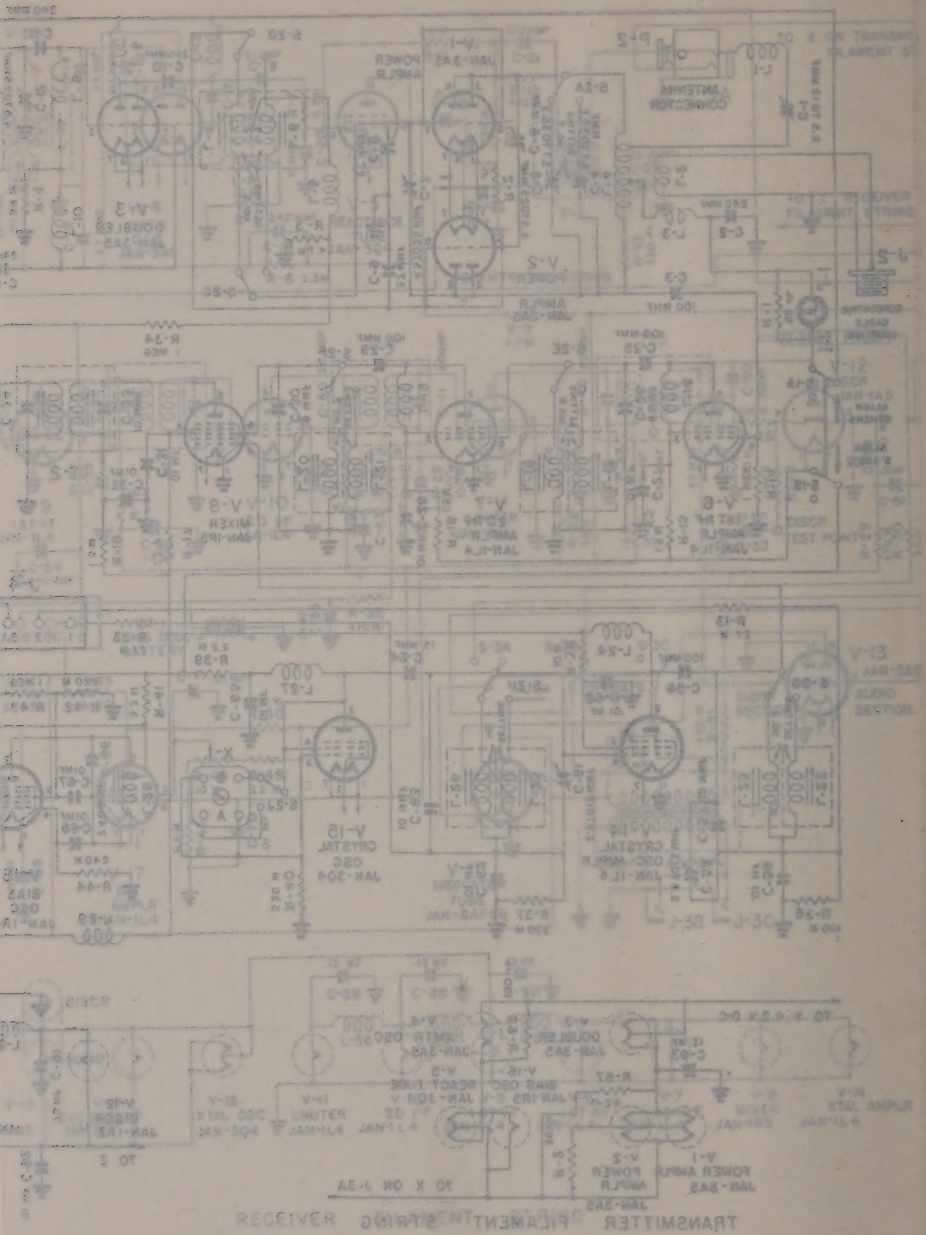


Figure 41. Receiver-Transmitter BC-1335, complete schematic diagram.